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AN EMPIRICAL STUDY OF METROPOLITAN MARKET

CONDUCT IN FOOD RETAILING

by

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The undersigned certify that they have read and
recommend to the Faculty of Graduate Studies for acceptance
a thesis entitled "An Empirical Study of Metropolitan Market
Conduct in Food Retailing," submitted by Donald Grant Devine
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ABSTRACT

Contemporary metropolitan market conduct in food retailing notably affects social welfare, consequently, it warrants empirical examination. The entire realm of price and non-price strategy practiced by food retailing organizations is concentrated in large urban centers such as Edmonton.

The broad objective of this thesis is to determine the nature of price behavior as a signal of market information and as a tool of competitive strategy. Price and non-price tactics employed by food retailing outlets are largely responsible for the type of market information and the degree of price efficiency in the market. Prices and market information are considered synonymous in the determination of price efficiency--the basic criteria for evaluating market performance.

Market performance evaluation reveals numerous deficiencies. Market imperfections such as misleading prices, price discrimination, price inefficiency, deceptive advertising, market segregation, and consumer exploitation are readily apparent. The results of the analysis suggest that socio-economic improvements and market reforms are necessary in the areas of competition policy, advertising regulations, consumer education programs, and opportunity development.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER I

INTRODUCTION

The Importance of Food Retailing

Retail food stores are the principal source of food for North American consumers. In 1963, 75.1 percent of the value of food consumed in the United States came from retail outlets, compared to 18.3 percent for eating establishments and 1.2 percent for food produced and consumed on farms.[1] In Canada during 1967 grocery and combination stores, including all other food stores, had a retail trade of $6,043,000,000, accounting for over 25 percent of the total Canadian retail trade.[2]

Food is Canada's largest industry. Food consumed in 1964 by Canadian families in 11 major cities accounted for 20.7 percent of total family expenditures.[3] Expenditures for shelter were 16.9 percent of the total; transportation, 12.1 percent; and clothing, 8.6 percent.

The Need for the Study

Trends in food retailing provide one of the best general indicators of the Country's economic conditions. Most food items are ultimately sold through retail outlets, and such sales may largely reflect

[1] United States National Commission on Food Marketing, Organization and Competition in Food Retailing, Technical Study No. 7 (Washington, D.C.: U.S. Government Printing Office, June 1966), p. 1.

[2] Canada Dominion Bureau of Statistics, Canada Yearbook (Ottawa: Queen's Printer and Controller of Stationery, 1968), p. 895.

[3] Canada Dominion Bureau of Statistics, Urban Family Expenditure, Cat. No. 62-527, (Ottawa: Queen's Printer, 1964), p. 27.

[4] DBS, Canada Yearbook, op. cit., p. 895.

the financial position of the consumer. Consequently additional public

information regarding the competitive strategies of the retail outlets

should promote consumer rationality and social welfare as market trends,

conditions, and financial status of relevant market members become

available.

Currently the need exists for more public information about the

structure, conduct, and performance of food organizations. The relevant

center of inquiry into the competitive strategies of the food industry is

tending toward the large metropolitan areas of the economy.[1] For example,

chains have been credited with bringing strong competitive pressures

into local markets and then, by contrast, have been described as mono-

polistic intrusions into an otherwise competitive industry.[2]

In any event, food retailing organizations should account for

their market behavior in large urban centers. In this case accounting

for market behavior implies more public information leading to improved

pricing efficiency. Pricing efficiency may be tested by analyzing various

market characteristics. The following conditions as outlined by Williams

and Stout[3] provide a format for examination. Generally, more competition

is better than less; restrictions on entry and exit are considered impe-

diments to progress; markets function better with increased information,

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[1] M. H. Hawkins, A. A. Warrack, and W. S. Pattison, "Intracity
Retail Food Price Behavior," Canadian Journal of Agricultural Economics.
Vol. XIV, No. 2 (1968), 131.

[2] P. E. Nelson and L. E. Preston, Price Merchandising in Food
Retailing: A Case Study (Berkeley: Institute of Business and Economic
Research, 1966), p. 1.

[3] W. F. Williams and T. T. Stout, Economics of the Livestock
Meat Industry (New York: The MacMillan Co., 1964), p. 146.

buyers and sellers should be equally and uniformly informed; grades, standards, and weighing procedures, etc. should be carefully defined; markets should be free from excessive government interference and the rules of the game need to be explicit and enforced.[1] Adequate, equal, and honest information regarding prices through the market, qualities of products, and other market conditions are necessary prerequisites for rational decision making.[2] Price efficiency is required for either an improvement in welfare or the achievement of an ideal economy. By contrast the large number of new materials, products, packaging, weights, names, stores, and selling strategies has all but eliminated traditional consumer guides, implying irrational decision making and price inefficiency. Consumers are increasingly made to rely on information services provided by the retail organizations themselves. Consequently, advertising is one of the most heavily used sources of consumer information regarding food price comparison.

Prices and market information in many cases are synonymous. The price system theoretically operates to signal consumers as to when and where the best food bargains can be obtained. However, the questions arise: Is this information system efficient? Does it portray the correct message to the appropriate consumer at the correct time? Consumers will pay for an efficient market information system but can they distinguish the representative price signals from misleading price signals? To answer these and similar questions, an empirical examination of retail market conduct was undertaken.

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[1] G. R. Winter, "Conduct in Canadian Food Marketing," (University of Alberta, unpublished paper, 1966).

[2] G. R. Winter, Conduct in Canadian Food Marketing (Ottawa: Agricultural Economics Research Council of Canada, July 1969), p. 106.

A similar study carried out in 1968 in Edmonton provided a format for this research.[1] Several areas were recommended for further study by the 1968 project, and an attempt was made to include them in the present analysis. Different income groups in the market were considered in the research. This question was asked: Do the poor, the uneducated, the pensioners, the immobile, and the native population pay more for food items than the more affluent sector of the economy? A corollary question was also asked: Is the affluent minority, with its increasing demand for services, causing the underprivileged majority to pay for unneeded services and thus widening the disparity between the two sectors of the economy? Generally, it is regrettable that so little information is known about the activities of supermarkets and chain stores in large local urban markets.

The Basic Objective and Goals of the Study

The broad objective of the study was to determine the nature of price behavior as a signal of market information and as a tool of competitive rivalry in the retail food industry. The nature of price behavior includes the level and stability of prices on single items, groups of items, single stores, groups of stores, and the behavior of other market variables, such as advertising, that may be closely related.

Specifically the basic goals were to monitor and ultimately analyze retail food pricing patterns as they occurred (1) within all retail outlets, (2) within single firms, (3) between different firms, (4) within different social, economic, and regional areas of the city

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[1] M. H. Hawkins, A. A. Warrack and W. S. Pattison, op. cit., pp. 131-142.

(5) between warehouse and discount retail outlets, (6) in new stores, (7) in advertising, (8) in meat products, specifically beef, and (9) between private labels and national brand food items.

Scope of the Thesis

The following chapter will discuss the role of market conduct in industrial organization, emphasizing the oligopolistic characteristics prevalent in food retail organization. A brief resumé of theoretical limitations concludes the chapter. Chapter III explains the analytical techniques used in the study and outlines problems and limitations encountered in the analysis. Chapter IV describes the empirical results of the study and relates these to various questions concerning market structure, conduct, and performance. The structure and conduct analysis is intentionally kept descriptive in nature, whereas the performance analysis deals with the rationalization of empirical findings. Chapter V discusses conclusions, recommendations, and policy implications derived from the previous analysis.

CHAPTER II

A THEORETICAL FRAMEWORK OF MODERN INDUSTRIAL ORGANIZATION

The theory of market organization is customarily divided into
three subgroups for examination--structure, conduct, and performance.[1]
Structure is defined as the organizational characteristics of the market
that may influence the nature of competition. Market conduct is defined
as a firm's policies toward the moves made by rivals in that market.
Performance is defined as a firm's or industry's contribution relative
to its potential in promoting social welfare. Broad economic goals such
as full employment, efficient production, price and output stability,
growth, and equitable distribution of income or purchasing power are all
elements of the social welfare function.

Traditionally a basic question is one of causation. Is perfor-
mance influenced by structure, or structure and conduct, or do performance
and conduct lead to varying structural forms. In any case, a necessary
prerequisite in rationalizing the final state of affairs in an industry
is the independent observation of each element. Conduct, in the form of
pricing strategy, intimately affects the basic triad, yet it has had less
attention in modern research than either structure or performance.[2] The

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[1] Many of the ideas and arguments presented in this chapter
regarding industrial organization are taken from the recent article by
R. R. Hurnanen, D. G. Devine, and M. H. Hawkins, "Industrial Organization
and Policy Development in a Dynamic World," Canadian Journal of Agricul-
tural Economics, publication pending.

[2] J. M. Clark is perhaps an exception in that he diagnoses com-
petition in a realistic setting while trying to rationalize conduct activi-
ties in the marketplace. J. M. Clark, Competition As a Dynamic Process
(Washington, D.C.: MacMillan and Co., Ltd., 1961). The traditional hypo-
thesis and format for research follows J. S. Bain; namely, market structure
determines business conduct, which, in turn, determines social performance.
Joe S. Bain, Industrial Organization (New York: John Wiley and Sons, Inc.,
1959).

degree of concentration (structure) in a market can be the natural conse-
quence of competitive forces (conduct). In a competitive system there
always exists the chance of economic death because of the competitive
environment. Firms are quick to realize the surrounding circumstances
and, if at all possible, adjust their market activities to reduce the
degree of competition. The resulting concentrated industry still
experiences competition, but it occurs more through non-price variables
such as product innovation, quality, advertising, or services attached
to the product.

The accent for modern research and public policy is shifting
from pure competition, the ideal but unattainable state, to a feasible
and reasonably desirable state. Since monopolistic competition is the
rule rather than the exception, we are concerned with that variety of
competition. Contemporary research can probe the objectives and moti-
vations of the large corporations while searching for and suggesting new
ways and means for government to play a strategic role in promoting
social welfare. A strategic role for government does not in any way imply
either extreme, very limited, or complete interference but only a combina-
tion of free enterprise and public involvement which best promotes the
elements of social welfare. John Kenneth Galbraith in his book The New
Industrial State points out that society wants to revel in the joys of
progressiveness, efficiency and increasing productive capacity yet simul-
taneously bans the very means by which it can be attained; for example,
the large effective corporation with its market power, vertical integra-
tion, supply control, demand manipulation and generally planned market

atmosphere. Galbraith goes even further and indicates society is attempting to protect an ideology that it does not really want, for to declare illegal all corporations with the ability to control prices is, in effect, to declare the modern North American and Western European economies illegal.

> As a result the antimonopoly and antitrust laws are substantially a charade. Their function is not to prevent exploitation of the public, because if great size and great market power led to such exploitation, our case would have long since been hopeless. Their function is to persuade people, liberal economists in particular, that the market still exists, for here is the state vigilantly standing guard. It does so by exempting large firms and swatting those that seek to become large.[1]

This study is theoretically organized around and is intimately involved with the element of conduct. Pricing and non-pricing activities of retail food outlets provide the core of analysis.

Oligopoly and Market Conduct

The retail food industry in most large urban centers is characterized by a degree of oligopoly. Oligopoly is a form of competition. It is a particular market situation intermediate between pure monopoly and perfect competition or large group monopolistic competition.[2] Firms have options that purely competitive firms, in economic theory, do not, and they will be aware that decisions made by at least some individual firms will have a direct and immediate effect on all. Oligopolistic situations require both quantitative and qualitative examination for rational analysis. Quantatitive analysis refers to structure or to

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[1] J. K. Galbraith, "The New Industrial State," _Atlantic Monthly_ (July, 1967), p. 71.

[2] C. E. Ferguson, _Microeconomic Theory_ (Homewood, Illinois: Richard D. Irwin Inc., 1966), p. 267.

the number of firms (sellers) in the market and the percent share each

has of that market. The qualitative criteria is reflected in conduct

as it refers to the degree of interdependence that exists between firms

in the particular situation. Oligopoly is theoretically said to exist

if the number of firms is greater than one but small enough not to

completely eliminate the interdependence factor. Oligopoly theory is

consequently defined by economists as the theory of group behavior as

opposed to individual or mass behavior.

Basically examination of the oligopoly action-reaction situation

reveals a problem in the area of demand curves. Demand curves in the

market are interdependent at least to the extent that a change in the

pricing (or non-pricing) policy of one firm can automatically alter the

demand curves faced by remaining firms. The elasticities and cross

elasticities of demand have traditionally been used by economists to

distinguish the various possible market relationships.[1] Oligopolistic

situations are infinite in number and, as a result, contain infinite

action-reaction possibilities depending on the degree of elasticity of

demand.[2] For the individual firm the problem is one of a lack of indepen-

dence. Regardless of what output or pricing changes a firm makes, other

firms are affected, and in turn their response changes the first firm's

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[1] R. Bishop, "Elasticities and Market Relationship," _American Economic Review_, Vol. XLII (December 1952), 779-803.

[2] The cross elasticity of demand, for example, may be defined as the degree demand changes for firm i and firm j as firm i changes its price.

situation in the market. This inevitable interaction has been appro-
priately labeled mutual interdependence.[1]

The strategy involved under this mutual interdependence must
be viewed with two aspects in mind. One, the observer must distinguish
between the initiating action of a firm in the market and its response to
the reaction by rivals. Two, the observer must also realize that mutual
interdependence is a matter of degree depending on the number of market
participants.

Classical oligopoly models are relatively numerous in economic
theory.[2] Traditional basic assumptions include two producers, a homo-
geneous product, constant equal costs per unit of output, complete
knowledge of demand by both sellers, behavior based on maximizing profits,
and conduct based on each seller assuming the other will continue to act
in exactly the same way. The variables are either price or quantity.

If the duopoly behavior is characterized by sellers that
alternate action-reaction roles in the game, as each adapts, an equilibrium
will be reached at stable prices and output. Similarly if one firm is a
leader and the second firm always responds, the results are stable
output and prices as well.

Conversely, if both firms desire to be the leader, no equilibrium
is reached. In such cases, if production costs are not equal for both
firms, the low cost producing firm could force his competitor out of
the market.

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[1] R. Caves, American Industry: Structure, Conduct, Performance
(Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1964), p. 39.

[2] C. E. Ferguson, op. cit., p. 267-285.

One of the basic observations from these classic models is that exclusive output variation ultimately leads to something short of a perfectly competitive position while if price is varied exclusively the result is equilibrium at the competitive level of price and output. The questions arise as to which variable is to be primarily used in competitive strategy under oligopolistic situations and why? The answers become more evident as the classical assumptions are relaxed.

The problem is to establish the price and output levels that exist between a group of firms and theoretically rationalize why these particular levels occur. One can begin by using a traditional duopoly model. First relax one basic assumption; namely, that one firm is not ignorant enough to continue believing the other firm will remain at a static position when it actually has changed positions several times. Assume firms realize their interdependence. Thus they come to the conclusion that continual price cutting is detrimental to each member and that sharing the total monopoly profit is the ultimate profit position for both.

One can now make the further assumption that all firms are not of equal size and that one firm has lower costs of production. The result is usually a price leader in the market. The price leader can act as if he had a monopoly and therefore is able to maximize profits. Other firms will follow the price changes of the leader, and in the case of homogenous products, the leader's price is treated as the marginal revenue curve for all other firms. The adjustment of marginal cost to the marginal revenue maximizes the profits of followers in the industry. In this case prices will tend to be a little lower and output a little larger than in the previous example of monopoly profit sharing.

To continue the relaxation of classical assumptions, now assume
there is imperfect knowledge of prices, costs, and market conditions.
Firms in the market will now react more conservatively and may not have
maximum profits as their ultimate goal. To maintain the maximum profit
position may be too risky given the lack of knowledge about market con-
ditions. Insecurity may lead to alternate goals being pursued by the firm.[1]

However, regardless of other goals, a firm must maintain a
certain degree of profits to exist; hence all other goals are restrained
by some level of necessary profits. W. J. Baumol presented a model
concerning sales maximization constrained by a level of minimum profit.[2]
In Figure 1 the firm produces neither at the point of maximum profits
(Q_P) nor at the point of maximum sales (Q_S) but at some point in between
(Q_T). The exact position at which the trade-off will occur depends on the
shape of the curves involved or the degree of interdependence, competition,
technology, and management control in the market. For example, if costs
are decreased, the total profit curve is raised, output can be increased,
and price lowered. Conversely, if costs increase and/or revenue drops,
profits drop and sales are cut back. To maintain the minimum level of
profits, prices are raised. Profit maximization or monopoly output and
price levels may not occur in oligopoly situations as a result of
imperfections and uncertainty.

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[1] The firm may strive for perpetual life and the restriction
of competition or the stability of profits rather than maximization
of profits.

[2] W. J. Baumol, Economic Theory and Operations Analysis
(Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1965), p. 302.

Figure I

EQUILIBRIUM AND GOALS OF THE FIRM
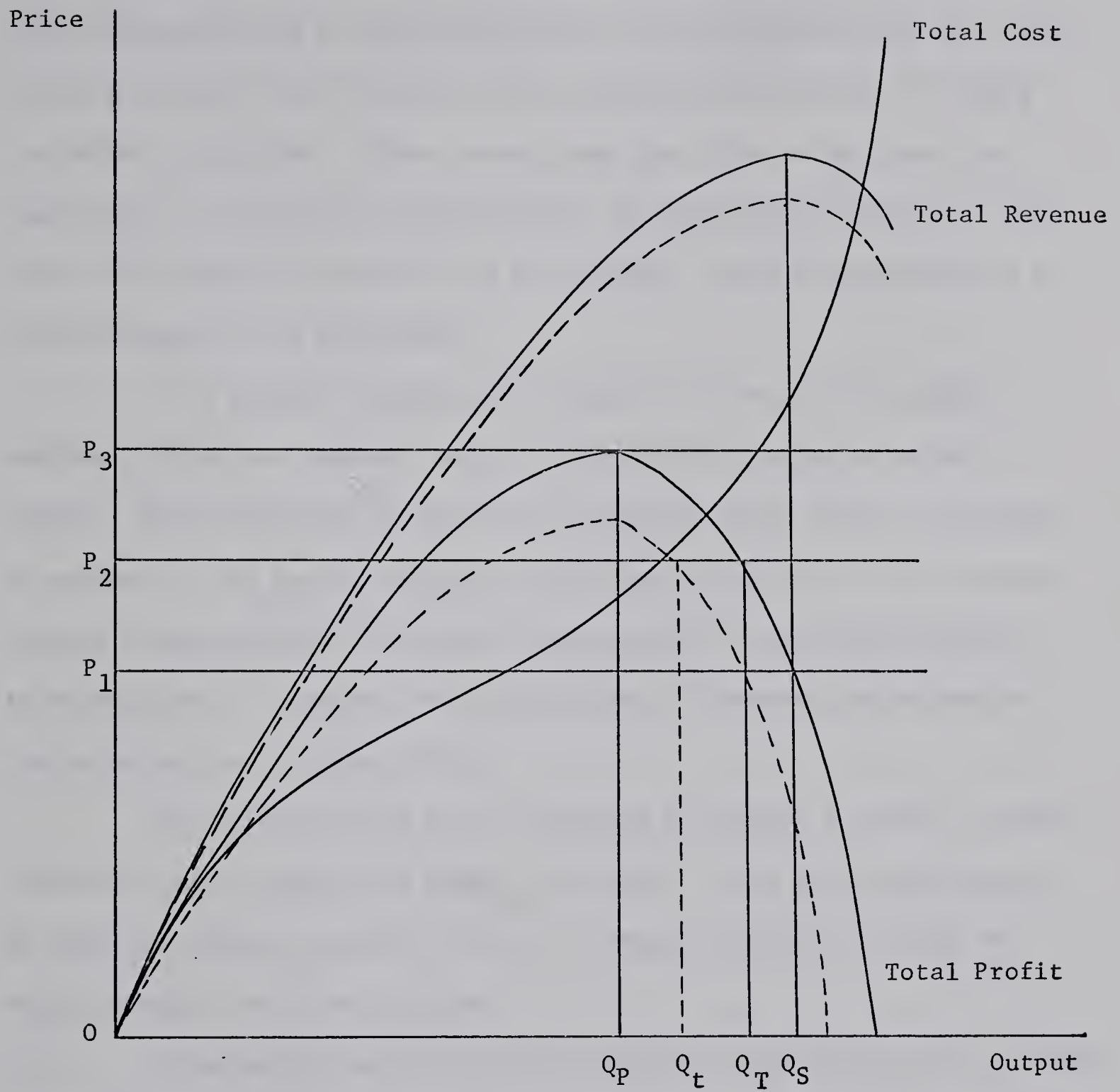
Source: W. J. Baumol, Economic Theory and Operations Analysis
(Englewood Cliffs, New Jersey: Prentice-Hall, Inc.,
1965), p. 302.

Assume that firms in an oligopoly have imperfect knowledge of demand, different products but reasonably substitutable,[1] a degree of cost differences and a strong awareness of interdependence on each other to the point that each will not change its position in fear of losing the market altogether. These assumptions give rise to the questions should they or should they not compete? If competition continues, will one or all firms be forced out of the market? Would an agreement be to the advantage of all concerned?

If a perfect agreement is reached by firms in the market, maximum profits are shared. Such an agreement is called a perfect cartel. The calculation of price and output is based on the principles of monopoly. The cartel marginal cost curve is equated to the marginal revenue curve derived from market demand and the equilibrium position is established. In short, the minimization of industry costs ensures the maximization of joint profits.

What firms may do as an alternate to forming a cartel is agree informally about respective market activities. Such quasi-agreements, as they are called, usually result in a common method of pricing or mutual respect for areas of sale.

Relaxing the assumption of restricted entry provides yet another possible solution to price determination. Assuming a constant elasticity

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[1] Substitute goods are items which serve similar purposes, so that the buyer may choose from among the set of substitutes which serve his desires. Usually substitutes are imperfect so that the buyer will not be indifferent between them--they serve somewhat the same purpose but do so imperfectly. An example would be chicken and turkey. W. J. Baumol, op. cit., (1965), p. 338.

of industry demand if another firm enters the industry, each individual firm's share is reduced and individual profits are reduced. Prices may be lowered resulting in greater output. To the extent prices are lowered and output is increased, the situation tends to become closer to that of pure competition.

In the examples presented thus far, prices and output levels have ranged from near monopoly to near purely competitive levels depending on the assumptions included in the particular oligopolistic situation. Group behavior has within its realm an infinite number of possible activities and hence the scope of oligopoly theory pertaining to price and output levels is equally as wide.

Oligopoly and Non-Price Competition

Firms in an oligopolistic market will tend to evade price changes as much as possible. Cartels may have a relatively short life because of the incentive for price changes. Price fluctuations in an oligopoly can be risky, expensive, and unreasonable.

The explanation for stable prices in oligopoly is presented by the kinked demand curve (Figure II). Assume here a fairly satisfactory price (P) has been established for all firms. Also assume if one firm lowers its price, others will follow to maintain their market share, while if a firm raises its price, others will not follow. If a firm lowers its price from P, then it and all other firms, for they too lower prices, face the market demand ED[1]. Individual demand curves have about the same elasticity as the market demand curve. If a firm raises its price, other firms will not follow, and the price raising firm loses some, if not all, of its market. It now faces the demand curve DE, which is far more elastic than that of the industry or that facing

Figure II

THE KINKED DEMAND CURVE
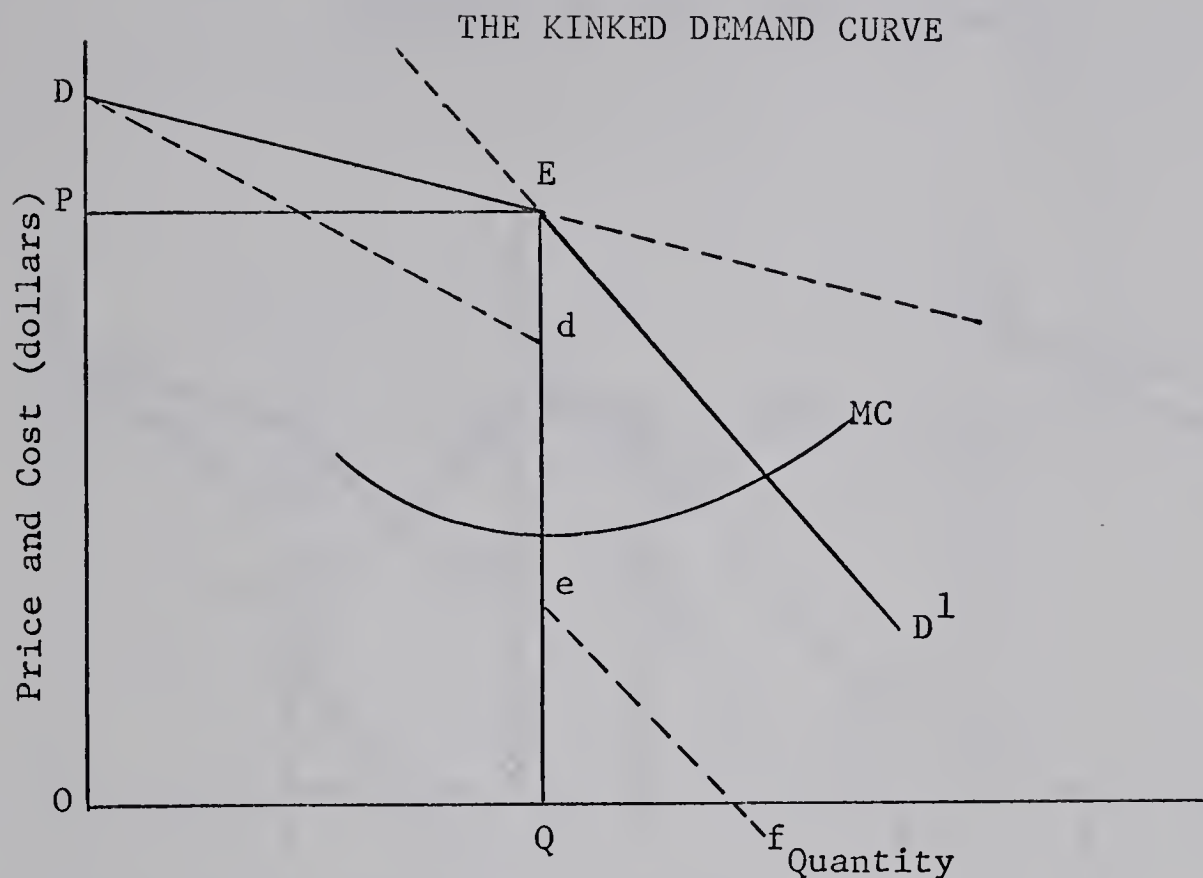
Source: C. E. Ferguson, <u>Microeconomic Theory</u> (Homewood Illinois:
Richard D. Irwin Inc., 1966), p. 267.

other firms. Thus under these conditions firms in the oligopoly tend

to maintain price rigidity.

Two other factors contributing to price stability are evident

in the example of the kinked demand curve. Output Q and price P are

the firm's profit maximizing output and price. In the range de, as

shown on the diagram, the MR curve is discontinuous. Hence costs may

be increased or decreased over this range without the firm changing

prices as maximum profits are still possible.

Similarly increases and decreases in market demand will not

change the firm's price structure if the changing demand is limited

enough so that the marginal cost curve still cuts the marginal revenue

curve in the discontinuous segment BA. The principle is illustrated

in Figure III. Although these assumptions do not apply to all

Figure III

STABILITY OF PRICE UNDER OLIGOPOLY
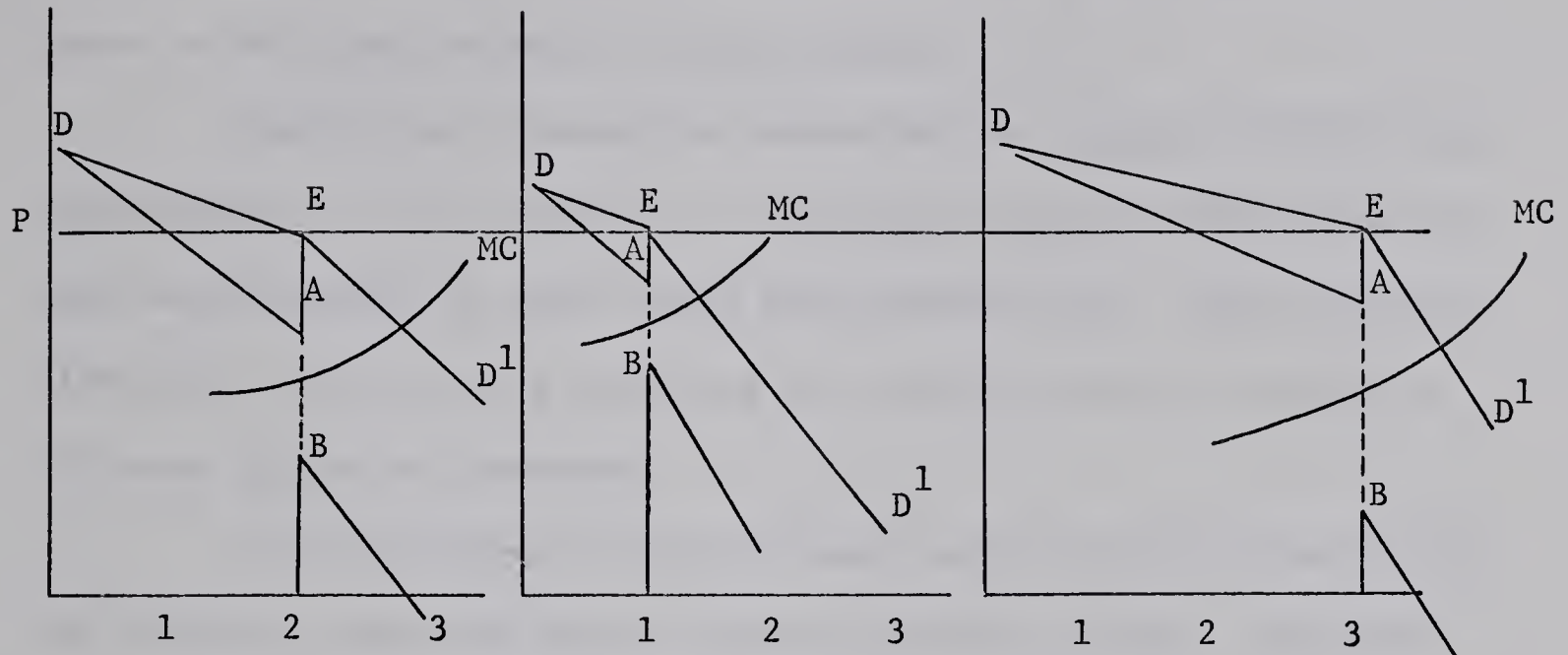
Source: An extension of Figure II.

oligopoly circumstances, they do aid in confirming the general price
rigidity hypothesis.

Generally firms in an oligopolistic industry experience uncer-
tainty with regard to actions and reactions of rivals. The less each
firm knows about the other, the less sure it is about the demand curve;
therefore, it is very skeptical about price decisions. It is concluded
that there are strong incentives for firms to practice non-price compe-
titive tactics and avoid the vulnerabilities of price changes and wars.

A much more subtle approach to increasing profits and market
share under oligopoly is experienced in the various forms of non-price
competition. Not only are such measures less risky and often equally,
if not more, successful than price wars, cartels, etc., they are legal
and largely appreciated by consumers in many cases.

Product differentiation is established in two ways, namely, design and quality variation and advertising. These two forms of competition are usually used simultaneously to shift the individual demand curve to the right and make it less elastic.

Quality improvement and innovation can increase market share significantly. It is, however, a continual struggle between firms for each new innovation is soon copied and improved upon. Often the same firm will produce varying qualities of a single product to appeal to different groups of consumers.

From the welfare point of view, quality variation and design can be both a detriment and an advantage to the consumer. Improved products through industrial research can improve public welfare. Conversely, design changes that add little to demand but increase product price may decrease consumer satisfaction.

In a similar way, advertising is used to increase the individual firm's market share. Product differentiation is often created in the mind of the consumer due to an advertisement or display. Firms hope to increase profits from advertising and will advertise to the point where the marginal cost of the program is approximately equal to its marginal return. Consider the following examples:

> ... As long as the industry demand is expanded at a rate which more than offsets the marginal costs of advertising and of satisfying the new demand, then both firms will find it to their advantage to advertise. The two strategies are to advertise or not to advertise. If one firm does so and the other fails to do so, the advertiser will increase his profits considerably ...

> ... If the industry demand shifts at a rate which just covers marginal costs of advertising and satisfying the extra demand.. ..neither gains by advertising but neither can risk not advertising ...

> ... If the industry demand does not expand sufficiently to
> cover extra costs....the payoffs of the firms are so inter-
> locked that they may be able to attain many different equi-
> librium levels of advertising expenditure. Each firm knows
> that any increase would result in an opposing increase; hence
> it would be unprofitable ...[1]

Shubik used these three cases to illustrate the importance of

non-price competition, for example, advertising as an area of strategic

flexibility. He has assumed that both firms have approximately the

same resources and the expected effect of any two strategies can be

predicted.

One must realize that advertising may act as a demand shifter

alone, or it may solely influence the slope of the demand curve or some

combination of both. Firms with low elasticity of demand can be expected

to be heavier advertisers in order to lower the marginal value product

to equality with their elasticity of demand, or shift the demand curve

to the right.[2] Firms having a high elasticity of demand will try to

shift demand or reduce the elasticity. The alternative available to

the firm largely depends on the particular market situation and particu-

lar products being sold. With reference to the food retailing industry

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[1] Martin Shubik, <u>Strategy and Market Structure</u> (John Wiley
& Sons, Inc., 1960), p. 252.

[2] Firm elasticity of demand, n, is defined as:

$n = \dfrac{\partial f}{\partial p} \cdot \dfrac{p}{q}$ where p = price, q = quantity demanded, and q = f(p,s).

Marginal value productivity of advertising, u, is defined as:

$u = p \dfrac{\partial f}{\partial s}$ where s = advertising budget.

The necessary condition for profit maximization at any level of output is:

$q \dfrac{\partial f/\partial s}{\partial f/\partial p} + 1$ or by substitution n = u.

advertising must be examined from two different yet related market structures--imperfect competition and differentiated oligopoly--as elements of both situations are evident.

Advertising and Imperfect Competition

The distinguishing feature between perfect competition and imperfect competition is the fact the latter situation is characterized by product differentiation. While in the food retailing industry differences between products may be either real or imagined on the part of the consumer, it may substantially affect the elasticity of demand. Theoretically the elasticity of demand should be low for two reasons:

1. Unilateral price-cutting will, in all likelihood, lead to mutual price-cutting by other firms. Consequently firm elasticity of demand may be approximated by the industry demand.

2. Attachments that consumers exhibit for a particular firm (or product) may deter them from switching to a lower priced substitute. Ordinal preference ranking is generally associated with lower elasticity of demand than cardinally rated preferences. Inability on the part of consumers to know exactly what different brands or commodities are worth dulls the effect of price changes by competitors (as well as aggrevate the consumer's ability to check and compare).[1]

The conditions outlined above are conducive to extensive advertising. While advertising may shift the demand curve under such circumstances, it is most probable that the shape of the curve is changed, becoming less elastic.

Consumer attachments tend to enable sellers to extract a degree of monopoly profit through product differentiation. However, the fact that some firms sell cheaper but less-advertised products

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[1] L. G. Telser, "How Much Does it Pay Whom to Advertise," *American Economic Review*, Vol. LI (1961), 194-205.

and yet manage to survive, may indicate that many consumers are price conscious. It follows that a wide variety of prices may be the result of imperfect competitive conditions.

Advertising and Differentiated Oligopoly

Normally a distinguishing feature of oligopoly is that prices are relatively rigid or essentially fixed through quasi-agreements by the major firms. Competition thus takes other forms, advertising being especially significant.

The rigidity of prices implies high cross elasticities of demand between firms. The price elasticity of demand for each individual firm varies depending on the degree of competition but generally is high also. The extent to which advertising is employed depends more on the elasticity of demand associated with industry or a very large firm rather than the price elasticity of demand experienced by each individual firm. In this respect differentiated oligopoly resembles the imperfect competitive situation.

A somewhat special case of differentiated oligopoly becomes evident in the case of price leaders in the industry. Such firms can change prices and be relatively sure that other firms will follow. The price leader is primarily concerned with his individual price elasticity of demand but attempts to mold that of the industry in the appropriate direction. As a result, such price competition at the retail level may be attributed more to economies of scale than anything else, although price fluctuation by one firm often induces similar practices into competitors' strategies. For example, the recent opening of discount stores may reflect this practice. Retail

advertising under these circumstances is concerned with information,
terms of sale, services, location, and advertised price specials.
With low elasticity of market demand, price competition is virtually
non-existent. Firms typically have high elasticities of demand (Kinked
Demand Curve). Theoretically if the inverse relationship between
advertising intensity and elasticity of demand holds true, there should
be little advertising. This assumption can be modified if one further
condition holds true--a large potential market being available. If
advertising can induce customers to change, that is, try firm A's pro-
duct rather than firm B's product, price being constant, the demand
curve for firm A may be shifted to the right indicating increased sales
volume. Price cutting by firms will not increase total sales appreciably.
The available market shares will simply be reallocated, at a lower price,
with little benefit to all firms involved. Generally, the conditions
that lead to heavy advertising under oligopolistic market structures
may be summarized as follows:

    1. Few firms--at least a few relatively large ones.

    2. High cross elasticities of demand.

    3. Large potential market.

    4. Price leaders.

Limitations in the Theoretical Framework

The standard structure-conduct-performance model is subject
to a number of important limitations and afflictions when applied to the
analysis of retail market rivalry.[1] Retail markets are customarily
defined from the market demand side, inevitably splitting a large

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[1] P. E. Nelson and L. E. Preston, op. cit., p. 2.

interregional organization into a number of local markets. Consequently, the competitive action of a multi-market firm obviously cannot be adequately analyzed in the examination of a single local market. Conversely, however, traditional analysis is largely focused in the interregional market as a whole and overlooks pocket areas and local market deficiencies. Differentiation of product, store, firm, and enterprise presents another problem in that local price, product, service, and atmosphere differences are explained and theoretically determined by the degree of local differentiation, while these elements themselves are a facet of the differentiation of the enterprise. The traditional model has yet to provide an adequate operational set of conduct prerequisites from which to evaluate market behavior. The problem appears to center on the gap between theory and theoretical application. A basic set of operational conduct criteria has not been formulated and, consequently, is yet undetermined, for example, if large scale organization coupled with concentration is synonymous with unfavorable conduct and performance. The entire market organization has not been framed in an equilibrium context to facilitate speculative evaluation of the optimality of changing local and global market formations.

CHAPTER III

ANALYTICAL TECHNIQUE

Observation and comparison comprised the core of analysis
carried out in the study. By empirically monitoring price data, direct
comparisons could be made between products, stores, weeks, and advertise-
ments. The results of such analysis were often self-explanatory. Various
statistical techniques, however, were employed in examining subsets of
data in an effort to determine causality, significance levels, or fre-
quency distributions. These and other analytical techniques are described
in the following paragraphs.

Sampling

A total of 29 supermarkets were selected for the study.[1] Care
was taken to assure representation from the major regional, economic,
and social areas of Edmonton (Figures IV and V). Approximately seven
retail outlets from each of the four principal geographic areas of the
city were included in the sample (Appendix A, Table 1). Attention was
paid to include groups of stores clustered together to examine the com-
petitive strategies under such circumstances. Discount stores were
included for similar reasons.

A total of 77 food items were priced, with each brand and
weight specified in the questionnaire (Appendix A, Table 2). Twenty-
five of the items were meat, and the remaining 52 were non-meat

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[1] There is a total of 424 retail outlets in Edmonton, 332
being independently operated.

Figure IV

GEOGRAPHICAL AREAS OF EDMONTON[1]
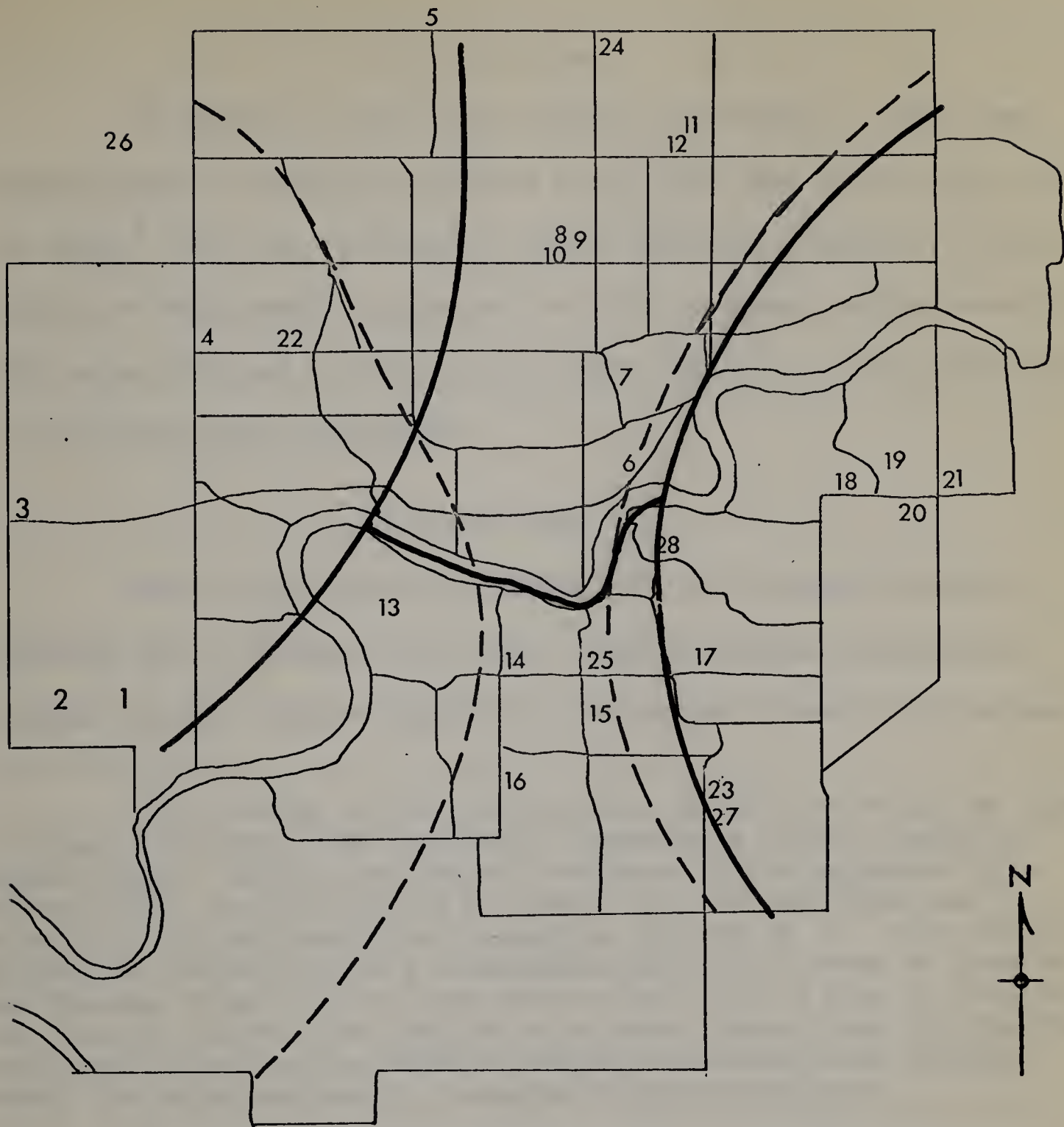
Figure V

LOCATION OF STORES IN SURVEY: Socio-Economic Regions

Note: The underprivileged region is contained between the two dotted lines; the affluent regions are on either side.

_____

[1] The geographical areas designated above were used in regional analysis.

Figure IV

GEOGRAPHICAL AREAS OF EDMONTON[1]
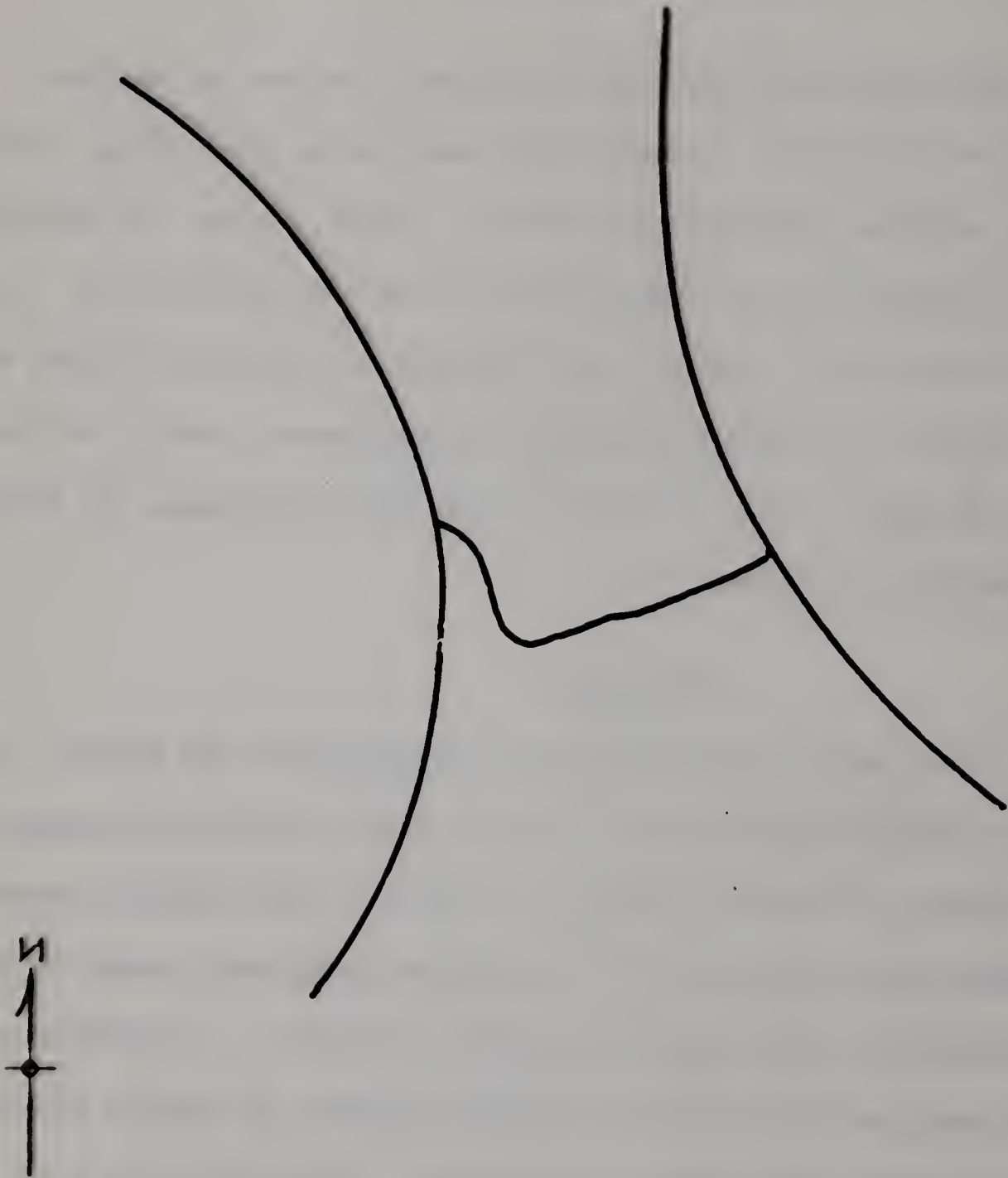
---
[1] The geographical areas designated above were used in regional analysis.
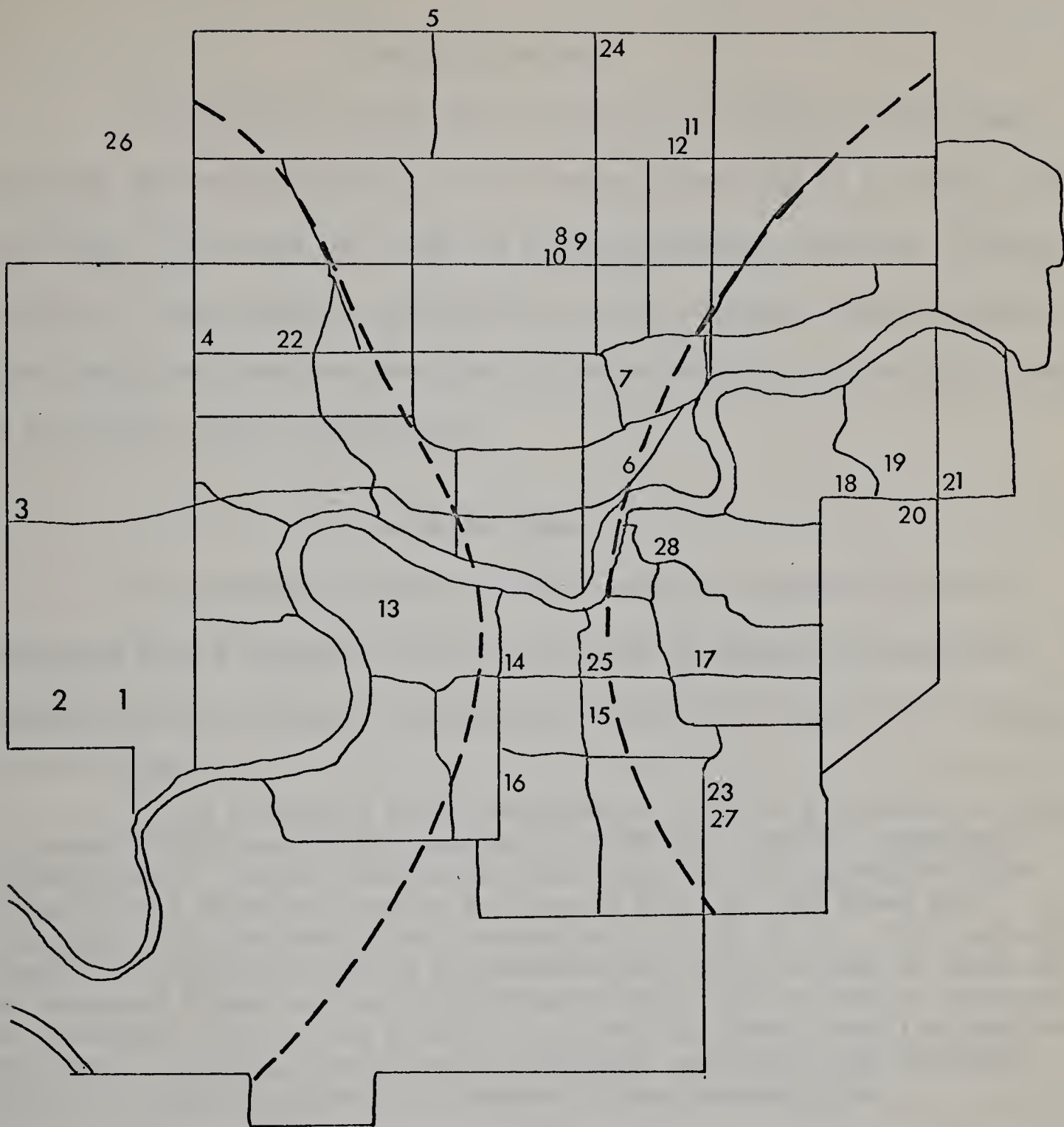
Figure V

LOCATION OF STORES IN SURVEY: Socio-Economic Regions

Note: The underprivileged region is contained between the
two dotted lines; the affluent regions are on either
side.

(staple) items.[1] Nine items included both national brands as well as

private labels.[2]

Data Collection

An initial 11 weeks from January 15 to March 15, 1969, was

observed, and an additional two-week survey from June 27 to July 5, 1969,

was taken.[3] Data was collected on either Wednesday, Thursday, Friday, or

Saturday of each week to correspond to local newspaper advertisements.

Advertising data was recorded for all weeks included in the questionnaire

to facilitate price comparisons.

Weighted Index

The raw price index of actual data was recorded and then

converted into a weighted price index based on consumer expenditure

patterns and the relative significance of various items in the average

---

[1] In making up the questionnaire, special attention was taken
to choose items that would reasonably represent a normal consumer's
market basket. Using a statistical breakdown of the aggregate value
of per capita food consumption by item, a list of food items was
selected. U.S. National Food Commission, op. cit, p. 7. This selection
process is crucial in that a supermarket may carry as many as three to
six thousand items, all of which theoretically play a role in absorbing
the consumer budget. The problem is to select those items (in this case
they were limited to food items to simplify analysis) that normally
absorb the major portion of a consumer's food expenditure.

[2] Merchandise packaged to a retail firm's specifications
(either by the retailer or a packer-supplier and under the retail
firm's brand or label) constitutes a private label. A national brand,
on the other hand, refers to merchandise which is packaged, labelled,
and distributed by a nationwide organization. In such cases retail
prices are usually suggested by the national distributor.

[3] Price taking was done by the undergraduate members of the
Agricultural Economics Undergraduate Club at the University of Alberta.

consumer budget (Appendix A, Table 3).[1] For example, beef items normally

represent about 12 percent of the average consumer's food budget. In

this study seven beef items were priced, resulting in the raw price data

of each individual item being multiplied by a value of 1.7 (12 ÷ 7 = 1.7).

Individual meat products were weighted because of their relative

importance in food consumption.[2] By weighting the raw price index by

the appropriate figures the calculated price index presents a more

realistic representation of both the prices the consumer must pay and

the relative importance of individual items in the retail store. Without

such weighting a store that is lower in price on volume items, such as

butter, may end up higher in price than stores with lower prices on items

that do not represent as large an expenditure. To test the actual

influence the weighting factor had on comparing store prices, the raw

price index was used in ranking stores and then the weighted price

index was compared to this previous ranking. Using an 11 week summary

for both rankings, stores ranked in the highest 5 percent with raw price

data moved to as low as the bottom 20 percent when ranked with the

weighted price index (Appendix A, Table 4).

Variance Analysis

Statistical variances were calculated for each item, each

store, each week, and various combinations thereof. In all cases the

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[1] U.S. National Commission on Food Marketing, op. cit., p. 7.
Also Canada Dominion Bureau of Statistics, Urban Family Food Expenditure
(Ottawa: Queen's Printer and Controller of Stationery, 1962), pp. 46-53.

[2] M. H. Hawkins, "An Analysis of Structure and Conduct in the
Wholesale Meat Industry in Ohio" (unpublished Ph.D. dissertation, Ohio
State University, 1967).

weighted price index was used in the variance calculations to facilitate

consistency in making comparisons with weighted price levels. The

general formula for sample variance was denoted by $V(R)$ and defined by[1]

$$V(R) = \frac{\sum_{i=1}^{n} X_i^2 - (\sum_{i=1}^{n} X_i)^2/n}{n} \, .$$

If i = items,
  s = stores,
  w = weeks,

then the overall variance can be written as

$$V(R_{isw}) = \sum_{i=1}^{II} \sum_{s=1}^{SS} \sum_{w=1}^{WW} (R_{isw} - \bar{R}_{iw})^2/N$$

where $R_{iw} = \dfrac{\sum_{s=1}^{SS} R_{isw}}{T}$,

and where $N = II \cdot SS \cdot WW - NZERO$, ($NZERO$ = no. of zero entries),

and where $T = SS - SSZERO$ ($SSZERO$ = no. of zero entries). In the study

there were 77 items, 29 stores, and 13 weeks, and consequently a total

of 29,029 estimates for the overall variance calculation. (For an

example see Appendix B.)

Chi-Square Computation and Regression Analysis

A comparison of price levels, price variation, and the range

of variation was undertaken to determine if a relationship existed

between individual store price levels and price variation. Are the

highest priced stores constantly those with relatively volatile prices?

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[1] Bernard Ostle, Statistics in Research (Ames, Iowa: Iowa
State University Press, 1964), p. 134.

Two tests were carried out--one using all stores in the survey, and the second using only those stores in Firm A.

The null hypothesis was that no relationship existed between price variation and the actual weighted price index. The hypothesis was first tested by computing the chi-square for an appropriate contingency table.[1] Stores were ranked as high and low with respect to both level and variances. The median for each set of numbers was used to rank figures insuring adequate representation in each cell. The chi-square was computed using a conventional format:

$$X^2 = \Sigma_i \Sigma_j \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Using all stores, the calculated chi-square (2.77) was less than the chi-square value which was expected due to randomness (3.84); the hypothesis could not be rejected. By contrast using Firm A stores alone, the calculated chi-square (16.0) was greater than the value expected due to randomness (3.84); therefore the hypothesis was rejected. From these results, the weighted price index variation was apparently independent of the weighted price index level for all stores yet showed a definite relationship for stores in Firm A.

To confirm the former results an attempt was made to determine to what degree price variance affected the weighted price level.[2] The weighted price index level was used as the dependent variable. One independent variable was used, namely, the weighted price variation.

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[1] Bernard Ostle, op. cit., pp. 129-130. For the complete analytical procedure see Appendix B.

[2] K. A. Fox, Intermediate Economic Statistics (New York: John Wiley & Sons Ltd., 1968), pp. 96-102.

The functional relationship was expressed as follows:[1]

$$X_1 = f(X_2)$$

where

X_1 = weighted price index levels, and

X_2 = weighted price variations.

The functional form was linear,

$$\hat{X}_1 = \hat{\beta}_1 + \hat{\beta}_2 X_2 .$$

The regression equations contained all positive coefficients, that is, positive slopes and positive intercept terms. Using all stores in the survey, the regression equation was as follows:

$$\hat{X}_1 = 6,680.6289 + 0.008916X_2,$$

and for Firm A stores only, the equation was:

$$\hat{X}_1 = 6,524.1792 + 0.000202X_2.$$

Both equations indicate a positive relationship between price level and variation. The coefficient of determination for the former equation was 0.02366, indicating 2.36 percent of the variation in the weighted price level was explained by the variation in the independent variable. The standard error of the coefficient was 0.0112, resulting in a calculated students t distribution value of 0.801. To comply with the null hypothesis, the regression coefficient should equal zero. The alternate hypothesis is that the regression coefficient is greater than zero. Using 28 degrees of freedom at the 95 percent probability level, the expected t value due to randomness (2.048) was greater than the calculated t value (0.801). As a result the null hypothesis that the two variables are unrelated could not be rejected. The two variables

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[1] See Appendix A, Tables 5 and 6.

appear to have no correlation with or affect upon one another in the
population from which the sample observations were drawn.

Conversely, the coefficient of determination for the latter
equation (using Firm A stores) was 0.2745, indicating 27.45 percent of
the variation in weighted price levels was explaiaed by the variation
in the independent variable. Using 15 degrees of freedom at the 95
percent probability level, the expected t value due to randomness (2.131)
was less than the calculated t value (2.301). As a result, the null
hypothesis was rejected and the alternate hypothesis was accepted; the two
variables were related or there was a correlation between price variance
and price level.

These results confirmed those of the chi-square computations.
The weighted price index variation was independent of the weighted price
index level, using all stores in the survey, while a definite relationship
(positive) existed between the two variables for stores in Firm A.

Socio-Economic Delineation

The city of Edmonton was divided into socio-economic categories.
The delineation was based on a recent study on community opportunity in
Edmonton.[1] The social area analysis involved several census variables
to delineate socially homogeneous areas of Edmonton. Seven variables
were used for this study:

(1) Age distribution of population,

(2) origin of birth,

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[1] George Kupfer, Community Opportunity Assessment (Edmonton:
Alberta Human Resources Research Development Executive Council, 1967).

(3) years of completed education,

(4) labor and management skills,

(5) income,

(6) age of dwelling units,

(7) social rank scores.[1]

Two distinct socio-economic classifications were developed from the variables in question. A privileged or affluent sector of the population was distinguished from an underprivileged sector. The underprivileged population had the following characteristics in this study: they were 65 years of age and over, foreign born, had not completed more than three to five years education, were semi-skilled or laborers, had low income per head and family,[2] were characterized by low social rank scores, and occupied dwellings constructed before 1920.

Stores used in the price survey were classified with respect to the two socio-economic regions. One group of stores theoretically represented the high ranking socio-economic populations, while the second group catered to the underprivileged sector. Analytical comparisons carried out on the two regions involved price levels, price variance, individual stores, different chains, and different time periods. Results of these comparisons are found in the following chapter.

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[1] A Social Rank Index was developed in Kupfer's study to give a picture of the concentration of various socio-economic characteristics in the population. This index was used in the present analysis to help segregate areas of the city with respect to overall social well-being (and opportunity) of the people involved.

[2] Average wage and salary income per head ranged from $2,000 to $4,999, and for families ranged from $3,000 to $5,999.

Frequency Analysis

A frequency analysis was carried out in an effort to detect the existence of any price discrimination within a single firm. To this end beef prices in stores of Firm A were subjected to a frequency analysis of price discrepancies. Raw price data were used in the analysis as the frequency of discrepancies, not the magnitude, was the relevant feature of examination. The weekly price mode for each item was used as the price norm from which discrepancies were tabulated. A minimum price difference of five percent was the criteria used in establishing significant differences. Subject to the minimum requirement, the situation was considered completely binary. A price was either the same, or it was different than the norm for that week.

It was hypothesized that prices within a single firm at any given time would be identical for identical products in all stores. Based on this hypothesis, the degree of price discrimination would increase with the frequency of price differences indicating the degree of price discrimination. An example of the analytical technique and a table of results are found in Appendix C.

Analytical Limitations of the Study

A study of this nature warrants an extended time period for collecting price data. Although stores were priced for a period of approximately three months, a time span of six months to a year would more adequately represent the pricing activities of the retail outlets.

Similarly more food and non-food items could be used in such research. Care should be taken to choose items significantly representative of consumer purchasing habits, and such representation would be enhanced with a larger sample. A larger number of stores, including independent outlets, would also add validity to analytical results of such a study.

Finally, the element of human error is always a possibility in data collection. Because of this possibility, check runs were carried out on pricing data collected by surveyors. Although discrepancies were small, these can affect analytical results.[1]

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[1] Various stores were priced twice on identical days by different surveyors to check validity of questionnaires. The total price index never varied more than five percent.

CHAPTER IV

LOCAL MARKET STRUCTURE AND CONDUCT

Metropolitan Market Structure

A total of 424 retail food outlets are spread throughout metro-
politan Edmonton (Table 1). Ninety-two of the outlets are affiliated
with various chains, while the remaining 332 stores are independently
operated.[1] Approximately 20 percent of the corporate and chain affiliated
retail outlets were included in the 1969 price survey. Those chains
representing a relatively large share of the retail market trade in
Edmonton were monitored more extensively than the less concentrated
chains. The particular selection of stores surveyed theoretically
represented a market area within which the major action-reaction acti-
vities and competitive strategies of major food retailing organizations
could be observed and analyzed.

Market Conduct

The examination and analysis of market conduct has as its
nucleus numerous questions and implications. The following are some of
the more significant questions being posed. Do retail prices exhibit
any trend over time? How rational are consumer purchasing decisions?
How rational can they be, given the type of information being trans-
mitted by retail outlets? To what degree are the basic factors of
"price efficiency" being achieved? How significant are the subsets of

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[1] The top four chain operations in 1966 accounted for 73.4
percent of total food volume, the top eight for 88.9 percent. Prairie
Provinces Cost Study Commission, Report of the Royal Commission on
Consumer Problems and Inflation (Regina: Queen's Printer of Saskatchewan,
1968), p. 163.

Table 1

RETAIL GROCERY STORES IN METROPOLITAN EDMONTON INCLUDING
RETAIL GROCERY STORES SAMPLED, JANUARY 1969

Retail Grocery Stores	No. of Outlets	Percentage Share of Total Stores	Percentage Share of Chain Stores	No. of Stores in Sample
Canada Safeway	35	8.3	38.0	16
Loblaws	9	2.1	8.7	4
Dominion	3	0.7	3.3	2
I.G.A.	29	6.7	31.5	1
Tomboy	7	1.7	6.5	0
Woodwards	3	0.7	3.3	2
Eatons	1	0.2	1.1	0
The Bay	1	0.2	1.1	0
Alberta Trading	1	0.2	1.1	0
Discount	3	0.7	3.3	3
Coop	1	0.2	1.1	1
Independents	332	78.3	0	0
Total	424	100.0		29

Source: A. N. De Rocquigny, Supervisor, Products Inspection Division,
Canada Department of Consumer and Corporate Affairs, personal
correspondence, July, 1969.

the metro market, that is, the neighborhood markets within the city?
To what degree is traditional oligopoly theory consistent with the
empirical situation? How effective is between-store competition in
promoting competitive price levels? Are there definite price patterns
for the various socio-economic and geographical regions of the city?
Do stores of one firm price differently for identical products on iden-
tical days or within time periods? To what degree is local advertising
improving (or deterring) rational consumer choice? These and various
other questions warrant answers. Pricing activities are examined first,
followed by non-price analysis dealing primarily with advertising.

Price Behavior

An Overview of Metropolitan Price Activity--The average weighted
price index level for all stores in the survey was 67.4 with the 13-week
average ranging from 64.4 to 71.8. Individual stores ranged from a low
of 63.1 to a high of 77.6 for a maximum percent difference of 22.6 for
the weighted price index.[1] The three retail outlets representing Firm F
ranked the lowest in the city, while the next 15 consecutive stores in
the ranking index represented Firm A.[2] Firm G ranked the highest (or
most expensive) for the entire survey period (Table 2).

Store number 12, the highest priced store in the survey,
averaged 11.5 percent above store number 26, the lowest priced store.
Using the ratio of the weighted price difference to the mean price index,
an individual would have saved 4.2 percent by shopping at store number 26,

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[1] The percent difference is computed from the ratio of the
weighted price difference to the mean price index of the high and
low figures.

[2] For purposes of analysis discount operations were combined
and represented as Firm F. Store number 19 was affiliated with Firm B
while stores number 26 and 27 were independently operated.

Table 2

ALL STORES RANKED OVER 13 WEEKS[1]

Week	Index	Range	Index Rank[2]																												
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	67.3	63.1 - 71.8	27[3]	19	26	28	14	11	20	23	7	3	5	6	1	2	18	29	16	10	4	21	15	22	24	25	8	17	13	9	12
2	67.4	63.9 - 71.0	27	19	26	23	20	18	6	10	3	2	7	15	1	14	11	16	5	4	25	8	29	28	21	22	24	13	12	9	17
3	67.2	64.6 - 71.2	27	19	26	29	11	21	23	18	5	6	10	28	16	20	1	3	15	4	2	25	7	22	14	24	8	17	13	9	12
4	67.7	65.2 - 70.6	19	27	26	16	20	18	21	23	29	1	2	28	10	4	6	24	5	3	7	25	22	13	8	15	14	11	17	9	12
5	67.0	63.5 - 69.8	19	27	26	20	18	10	11	6	29	14	25	7	23	2	22	4	15	1	3	13	5	8	21	16	28	24	17	12	9
6	67.0	62.1 - 70.6	19	26	15	27	18	20	29	10	1	2	22	3	28	23	25	5	16	21	24	4	8	14	7	11	13	6	17	9	12
7	66.9	64.1 - 71.2	19	26	27	20	23	6	2	18	28	3	7	1	29	15	25	10	14	5	11	4	21	16	24	22	13	9	8	17	12
8	67.1	63.2 - 70.5	27	19	20	23	26	18	6	7	29	11	14	28	16	15	22	10	2	8	25	21	1	24	4	3	5	13	12	17	9
9	67.7	63.6 - 71.4	19	26	27	23	20	18	28	10	7	22	11	5	2	1	8	3	6	29	4	25	21	16	14	17	24	15	9	13	12
10	68.0	65.1 - 71.1	19	23	26	27	18	11	10	2	3	28	20	6	1	21	24	5	29	7	8	4	25	15	14	22	13	16	17	9	12
11	67.6	65.0 - 71.1	26	23	27	19	24	11	20	16	25	10	1	6	22	5	7	28	4	2	3	14	8	15	21	29	17	13	18	9	12
12	68.8	65.5 - 77.6	26	27	28	5	3	7	23	20	19	10	2	6	18	25	24	1	29	14	15	8	22	21	11	13	4	17	16	9	12
13	67.7	65.1 - 73.5	2	26	23	1	3	11	20	7	25	5	6	14	27	18	22	28	29	18	22	24	16	21	4	9	8	17	13	12	
Avg.	67.4	64.4 - 71.8	26	19	27	23	20	18	10	28	7	6	1	3	29	14	11	5	16	25	21	16	4	22	24	8	13	17	9	12	
Firm			F	F	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	C	C	B	E	D	D	G

1 All uncited tables are composed of original data monitored in the survey.

2 Ranking is lowest to highest (lowest is number 1). See also Tables 2, 3, 6, 8, 10, 11, 12, 13, 14, 15, 17, 20, and 21.

3 Numbers below the ranking index represent individual stores. For example, the number 27 in this case indicates store number 27 was ranked the lowest (1) in week one.

compared to the average price index of all stores. Compared to store number 12, using similar calculations, it would mean a food expenditure saving of 10.9 percent over the three-month period.

The weighted price variance for stores ranged from a low of 30.0 for store number 10 to a high of 134.9 for store number 19. Store number 26 ranked third lowest in price variance at 41.0 while store number 12 ranked second highest at 129.7 (Table 3).[1] The degree of competition seemingly had an effect on the level of price variance. Store number 26, affiliated with Firm F, had low variances for both meat and staple items, whereas both remaining firms affiliated with Firm F had relatively high variances for staple items.[2] Store number 26 was somewhat isolated, while stores number 19 and 27 operated under highly competitive conditions.

With respect to individual weeks price variance for the store aggregate more than doubled in week number 12 of the survey and remained relatively high in week 13 (Table 4). Week 12 was also characterized by the highest aggregate price index at 68.8 and this level continued into week 13 being above the survey average of 67.4.[3] Figure VI shows the 13-week weighted price movements for the aggregate of all stores including the range for individual weeks. The variance levels for all

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[1] Both meat and staple items for store number 26 had relatively low variances at 56.8 and 43.2, respectively. Conversely, store number 12 had a meat variance of 136.0 and a staple variance of 126.8.

[2] The variance in meat prices for store number 19 of Firm F was low primarily because few meat items were carried.

[3] During the time lapse between weeks 11 and 12 of the survey (twelve weeks), food prices increased extensively but began to decline by week 12. Market conditions at that time were characterized by a strong influx of advertised specials, apparently reflecting relative food bargains.

Table 3

BETWEEN-STORE WEIGHTED PRICE INDEX LEVEL
AND VARIANCE COMPARISONS

| Store | | | Total Index | | | | Meat Index | | Staple Index | |
No.	Firm	Region	Level	Index Rank	Var.[1]	Var. Rank	Level	Var.	Level	Var.
1	A	West	67.0	12	31.0	2	21.8	41.0	45.2	26.8
2	A	West	66.9	8	42.6	4	21.8	54.7	45.1	37.2
3	A	West	67.1	13	44.3	5	22.0	67.2	45.1	34.1
4	B	West	68.0	22	69.5	17	22.4	103.8	45.6	54.9
5	A	West	67.3	16	53.4	11	22.2	56.2	45.1	52.2
6	A	North	67.0	11	56.3	12	21.3	62.2	45.7	53.5
7	A	North	67.0	10	50.0	8	21.3	53.3	45.7	48.5
8	B	North	68.5	25	103.8	26	22.6	90.7	45.9	109.8
9	D	North	70.3	28	44.7	6	23.4	56.6	56.9	39.0
10	A	North	66.8	7	30.0	1	21.8	54.5	45.0	18.3
11	A	North	67.3	15	95.9	24	21.9	86.6	45.4	100.4
12	G	North	71.8	29	129.7	28	23.0	136.0	48.8	126.8
13	E	South	70.0	26	81.9	19	22.4	74.2	57.6	85.6
14	A	South	67.6	17	70.4	18	22.2	77.6	45.4	67.0
15	A	South	67.8	20	69.0	16	22.1	60.8	45.7	73.1
16	B	South	67.8	21	93.1	23	22.3	137.7	45.5	71.7
17	D	East	70.1	27	101.2	25	23.4	89.9	46.7	106.4
18	A	East	66.6	6	82.1	20	21.8	115.4	44.8	66.5
19	F	East	64.4	2	134.9	29	21.7	46.0	42.7	157.6
20	A	East	66.0	5	66.6	15	21.7	138.9	44.3	34.0
21	B	East	67.7	19	85.6	22	22.0	119.6	47.7	71.1
22	C	West	68.0	23	52.9	10	23.0	66.9	45.0	46.8
23	A	South	65.5	4	52.6	9	21.3	70.5	44.2	43.9
24	C	South	68.0	24	54.8	13	22.9	74.9	45.1	45.0
25	A	South	67.6	18	47.3	7	22.2	63.4	45.4	39.5
26	F	West	64.4	1	41.0	3	21.2	56.8	43.2	34.6
27	F	South	64.8	3	114.6	24	21.2	76.3	43.6	132.1
28	A	East	67.0	9	83.7	21	22.0	78.2	45.0	86.1
29	A	East	67.2	14	61.2	14	21.9	60.5	45.3	61.6

[1] Var. means variance.

Table 4

WEIGHTED PRICE INDEX LEVELS AND VARIANCE BY WEEKS

Date	Week	Total Index		Meat Index		Staple Index	
		Level	Variance	Level	Variance	Level	Variance
Jan. 15	1	67.3	83.4	22.3	102.9	45.0	74.7
22	2	67.4	67.4	22.0	79.0	45.4	62.3
29	3	67.2	67.7	22.0	84.1	45.4	60.4
Feb. 5	4	67.7	77.8	22.5	70.1	45.2	81.3
12	5	67.0	76.0	21.9	72.6	45.1	77.6
19	6	67.0	86.0	21.8	87.8	45.2	85.3
26	7	66.9	54.6	21.9	66.2	45.0	49.3
Mar. 5	8	67.1	79.7	21.9	89.5	45.2	75.3
12	9	67.7	65.6	22.1	78.1	45.6	59.7
19	10	68.0	63.0	22.3	86.6	45.7	52.0
26	11	67.6	77.9	22.2	76.5	45.4	78.6
June 25	12	68.8	159.9	23.1	139.3	45.7	169.6
July 2	13	67.7	137.4	22.1	88.8	45.6	160.8
Average		67.4		22.1		45.3	

Figure VI

AVERAGE WEIGHTED PRICE INDEX
ALL PRODUCTS PER WEEK
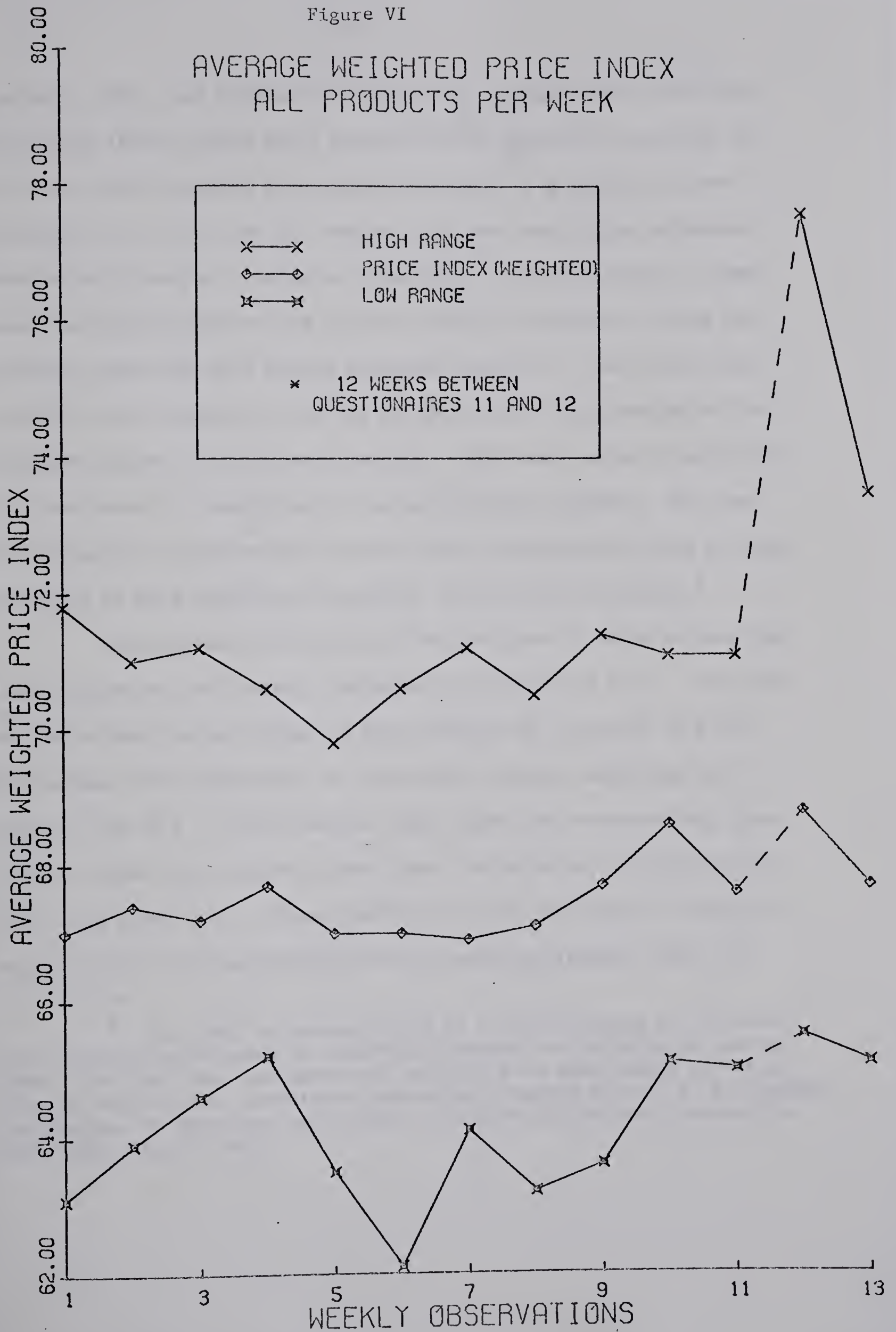
products, meats, and staples are represented in Figure VII. Both meat
and staple items reflect price variances that generally correspond to
the total price variance but usually fluctuate to a greater extreme.
In weeks 4, 5, 8, 10, and 11, however, the meat and staple variances
show signs of moving in opposite directions. In other words, in some
weeks the staple products had the more volatile prices and during the
alternate weeks the meat prices were more volatile. Meat prices were
generally more volatile at the end of each month, corresponding to the
increased number of advertised specials. Both these market characteris-
tics correspond to normal end of the month salary payments. The fact
that potential customers have recently been paid apparently has a strong
influence on food retailers' decisions to offer meat specials.[1]

Geographically the east and west regions of Edmonton were the
least expensive, both having a weighted price index of 67.0. The north
was the highest priced region at 68.4 followed by the south at 67.3.
The maximum price difference in percent for staples, examining all
regions, was 12.0. This value was three times the corresponding value
for meat items (4.0) and over five times the value associated with the
total food index (2.1). These results coincide with those of Figure VII
regarding the relative extreme price variation of staples (Table 5).

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[1] This fact is substantiated by a study carried out in Ohio.
Meat directors were asked to rank their reasons for deciding to run spe-
cials. The fact that customers had recently been paid ranked second in
order of importance. Competitors advertising ranked first. M. H. Hawkins,
"An Analysis of Structure and Conduct in the Wholesale Meat Industry in
Ohio," op. cit., p. 147.

Figure VII

AVERAGE WEIGHTED PRICE VARIANCE
ALL PRODUCTS, MEAT, AND STAPLES
PER WEEK
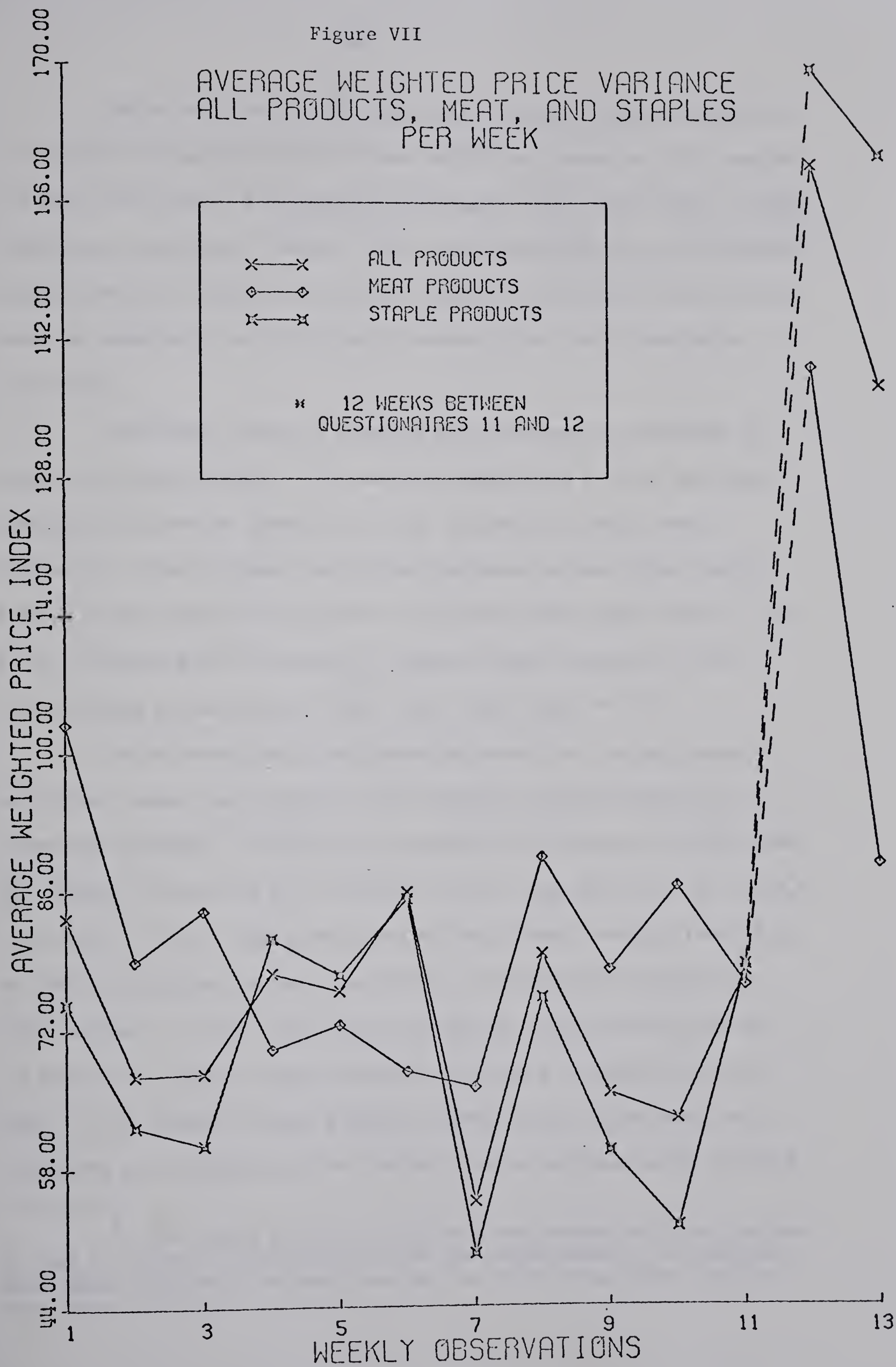
Price variance for the east region of the city was highest at 92.8, while the variance for the west region was lowest at 40.0 despite the fact both regions had identical aggregate price index levels. These results are consistent, however, with those developed by the chi-square computations and regression analysis, namely, that for the entire city there is apparently no relationship between price levels and price volatility.

Individual firms in Edmonton were compared on the basis of prices and price variance. The results showed Firm F to be the least expensive followed by Firms A, C, B, E, D, and G, in that order (Table 6).[1] Firm A showed the highest variance in meat items, while ranking second lowest with respect to the meat price index level. Firm F, on the other hand, revealed the highest staple variance at 89.5, corresponding to the lowest staple price index level of 42.8.

Price index levels and price variances for the aggregate of all stores, weeks, and products were examined, and the results are presented in Table 7. High and low extremes are indicated in each case. For example, stores had price variance levels ranging from a low of 29.9 to a high of 134.9. Weeks had price variance levels ranging from 54.6 to 159.9. Individual products exhibited the greatest extreme in price variance. Cream cheese had a relatively low variance level of 4.6 during the survey, while strawberry jam had a variance level of 486.9. With respect to meat products, blade roasts (blade out) reflected the most volatile prices, having a price variance level of 268.0.

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[1] When store number 19 of Firm F was grouped with the outlets of Firm B, due to its affiliation with that organization, the weighted price index for Firm B dropped from 68.1 to 67.3, being just slightly above Firm A (67.0).

Table 5

WEIGHTED PRICE INDEX LEVEL AND VARIANCE COMPARISON
OF FOUR REGIONS - ALL STORES

Region	Total Index		Meat Index		Staple Index	
	Level	Variance	Level	Variance	Level	Variance
North	68.4	76.5	22.4	74.9	46.0	77.2
South	67.3	77.6	23.0	75.0	40.7	78.8
East	67.0	92.8	22.1	95.7	44.9	91.5
West	67.0	40.0	22.1	51.9	44.9	34.9
Maximum difference	1.4		0.9		5.3	
Percentage	2.1%		4.0%		12.0%	

Table 6

WEIGHTED PRICE INDEX LEVEL AND VARIANCE
COMPARISON BETWEEN FIRMS[1]

Firm	Total Index				Meat Index		Staple Index	
	Level	Rank	Variance	Rank	Level	Variance	Level	Variance
A	67.0	3	49.2	2	21.9	52.7	45.1	47.6
B	68.1	4	51.6	4	22.3	49.3	45.8	52.8
C	68.0	3	21.7	1	23.0	26.8	45.0	19.4
D	70.2	6	31.0	2	23.4	28.2	46.8	32.4
E	69.9	5	0.0	0	22.4	0.0	47.5	0.0
F	64.2	1	73.7	5	21.4	31.2	42.8	89.5
G	71.8	7	0.0	0	23.0	0.0	48.8	0.0

[1] Variance was not calculated for Firms E or G because only one
store from each firm was priced.

Table 7

PRICE AND VARIANCE RANGE FOR ALL STORES, WEEKS, AND PRODUCTS

Item	All Products		Meat Products		Staple Products	
Average Weighted Price Index	67.4		22.1		45.3	
Average Weighted Price Index Range	64.4 – 71.8		21.8 – 23.1		45.0 – 45.7	
Variance Range for Stores	29.9 – 134.9		41.0 – 139.0		18.3 – 157.6	
Store Number Showing Extreme[1]	10	19	1	20	10	19
Variance Range for Weeks	54.6 – 159.9		70.1 – 139.3		49.3 – 169.6	
Week Number Showing Extreme	7	12	5	12	7	12
Variance Range for Products	4.6 – 486.8		7.7 – 259.4		4.5 – 486.8	
Product Number Showing Extreme	35	73	14	1	35	73

[1] Store number showing extreme means that store number 10 in the survey reflected the lowest variance level (29.9) and store number 19 was characterized by the highest variance level (134.9) on the basis of all products. Note that the store (product or week) numbers may remain the same even in other comparisons using meats and staple items.

A city-wide aggregate comparison was implemented, involving seventeen major categories. These categories were as follows: the four geographical areas containing all stores, the four geographical areas containing only Firm A affiliated stores, the seven major firms studied in the survey, and two socio-economic categories—one affluent and one underprivileged sector. Table 8 summarizes the results.

Ranking the least expensive in the aggregate comparison was the category representing Firm F, followed by Firm A stores in the east region of the city. The next lowest, or least expensive, category was that representing the affluent sector of society.[1] In contrast the underprivileged category ranked fourteenth in the general comparison or in the most expensive 25 percent. The various regional categories, whether representing all firms or those of Firm A, ranked together with the remaining major firms in random positions along the scale. The underprivileged sector of the population was characterized by the highest priced stores and the higher priced regions, whether referring to all stores or only those of Firm A. Firm A, and other firms as well, used different pricing strategies for various areas of the city. All of the social, economic, cultural, and regional factors seemingly have a direct and determining influence on the relative pricing activities within the entire market. Price movements of the various categories were plotted and are diagramatically represented in Figures VIII, IX, X, XI, and XII.

The average price indexes of the four main geographical regions of Edmonton are plotted in Figure VIII. The results show the north region to be priced highest practically every week. Figure VIII does

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[1] The affluent category contained all three discount operations and invariably the lowest priced stores of Firm A.

Table 8

AN AGGREGATE CITY COMPARISON OF SEVENTEEN MAJOR RETAIL CATEGORIES[1]

Week	Range	Index Rank																	Mean
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
1	62.9 – 71.8	14	8	4	1	6	17	9	5	3	7	16	10	2	11	12	13	15	67.6
2	64.1 – 70.9	14	7	6	9	5	3	1	8	17	10	4	16	2	11	13	15	12	67.5
3	64.3 – 71.2	14	8	4	17	6	7	9	3	5	7	10	16	2	11	13	12	15	67.5
4	64.7 – 70.6	14	8	4	17	1	10	3	5	9	6	11	7	13	16	2	12	15	67.9
5	63.2 – 69.8	14	6	8	17	3	4	9	1	7	5	13	10	16	2	11	12	15	67.1
6	63.4 – 70.6	14	8	4	17	1	9	7	3	5	11	10	6	16	2	13	12	15	67.2
7	64.1 – 71.1	14	8	17	4	9	1	6	7	5	3	10	16	11	2	13	12	15	67.1
8	63.3 – 70.7	14	8	4	6	3	7	9	17	16	2	10	1	11	5	13	15	12	67.4
9	63.5 – 71.4	14	8	4	17	6	1	9	7	5	3	11	10	2	16	12	13	15	68.0
10	65.0 – 71.1	14	6	8	4	17	9	5	1	7	3	2	10	16	11	13	12	15	68.2
11	64.9 – 71.1	14	11	3	7	6	1	17	9	5	10	16	2	4	8	12	13	15	67.9
12	65.6 – 77.6	14	5	8	9	7	1	17	6	4	11	3	16	2	13	10	12	15	69.3
13	65.7 – 73.5	5	14	6	9	1	7	8	17	3	11	4	16	2	10	12	13	15	68.1
Avg.	64.3 – 71.8	14	8	17	9	1	4	6	5	7	3	11	10	16	2	13	12	15	67.8

1 The categories are designated as follows:

All Stores	Firm A			
West – 1	West – 5	Firm A – 9	Firm E – 13	Underprivileged Sector – 16
North – 2	North – 6	Firm B – 10	Firm F – 14	Affluent Sector – 17
South – 3	South – 7	Firm C – 11	Firm G – 15	
East – 4	East – 8	Firm D – 12		

Figure VIII

TOTAL WEIGHTED PRICE INDEX,
GEOGRAPHICAL AREAS OF EDMONTON
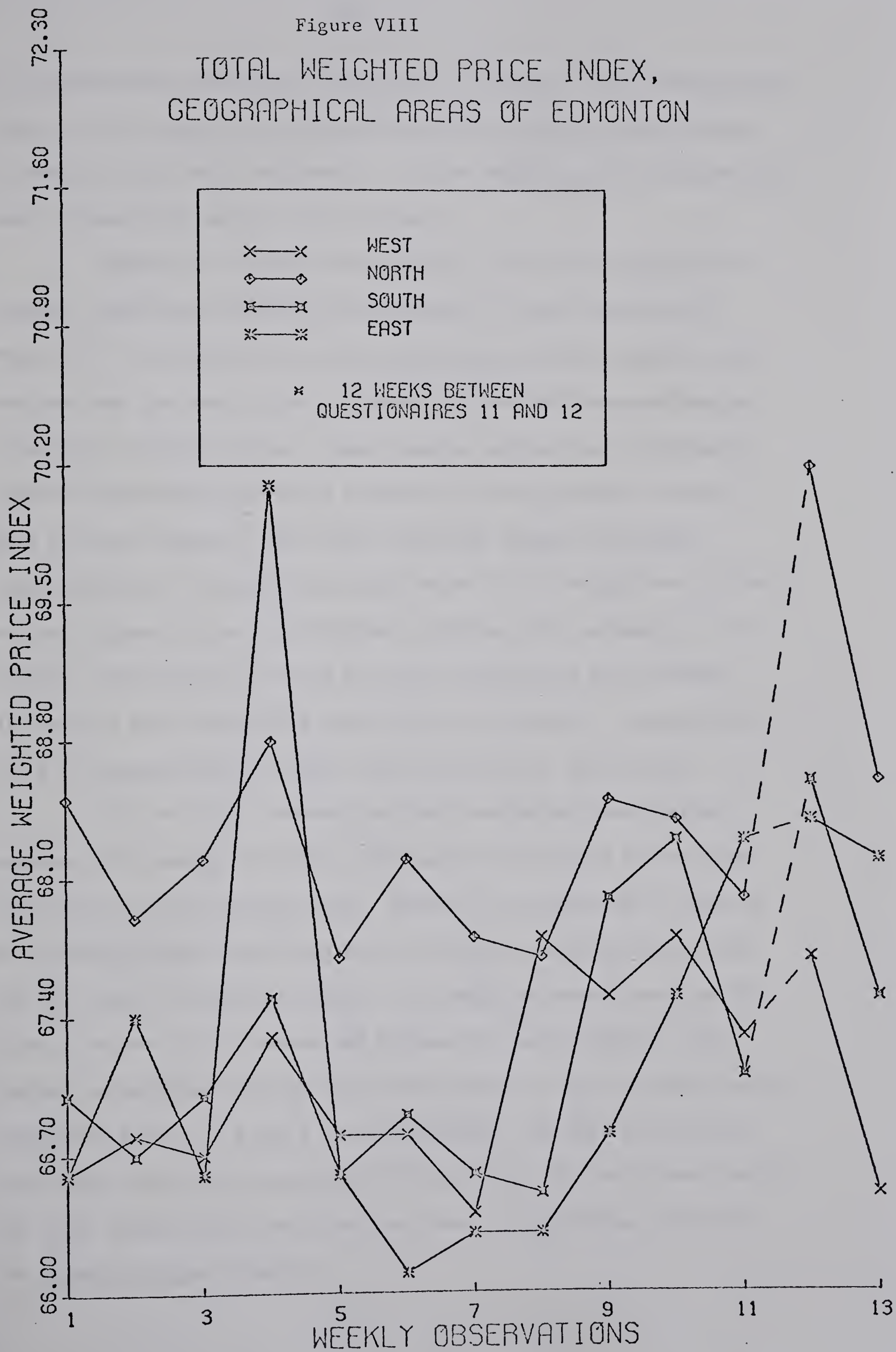
not indicate any significant time trends. However, if any similarities exist at all, they can be noticed between the highest priced regions of the city, the north and south. The east region again displayed the most extreme fluctuation in price levels.

Figure IX, showing Firm A stores in the four geographical regions, indicates somewhat similar results to those indicated in Figure VIII. The north and south regions have somewhat similar price patterns and the east region is generally lower and characterized by relatively volatile prices. These results confirm those previously presented regarding the effect regional and socio-economic factors have on price behavior. The north and south regions, generally characterized by the underprivileged sector of the population, reflect not only higher prices but relatively similar price movements. Conversely, the affluent east and west both experienced lower prices, although no price movement similarities were evident. Figures X, XI, and XII diagramatically compare the major firms in the survey.

The two socio-economic regional categories were further examined with respect to their individual price indexes and variance levels for meat and staple items. Results are summarized in Table 9. The underprivileged sector experienced a higher weighted price index for both meat and staple products. Although the percent maximum difference between price indexes was highest for meat products (1.8), similar calculations for the total food basket as well as staples were almost the same at 1.6 and 1.5, respectively. Variance levels were consistently of greater magnitude for all facets of the affluent sector but never varied more than 10 percent above corresponding values for the underprivileged category.

Figure IX

TOTAL WEIGHTED PRICE INDEX
FOR STORES IN FIRM A,
GEOGRAPHICAL AREAS OF EDMONTON
WEEKLY OBSERVATIONS

WEST
NORTH
SOUTH
EAST

✳   12 WEEKS BETWEEN
QUESTIONAIRES 11 AND 12
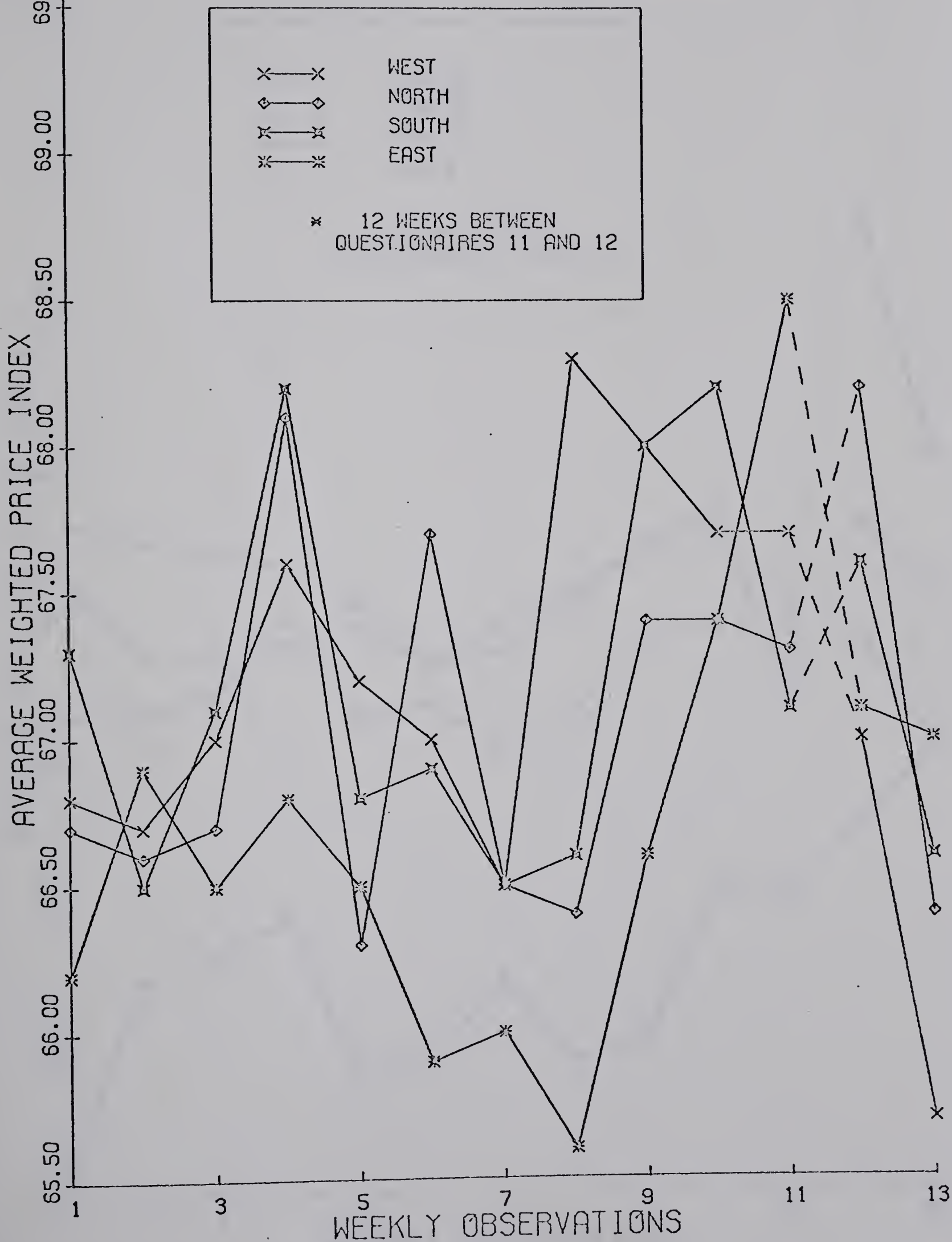
Figure X

TOTAL WEIGHTED PRICE INDEX
FOR STORES IN FIRMS A,B,C,AND F
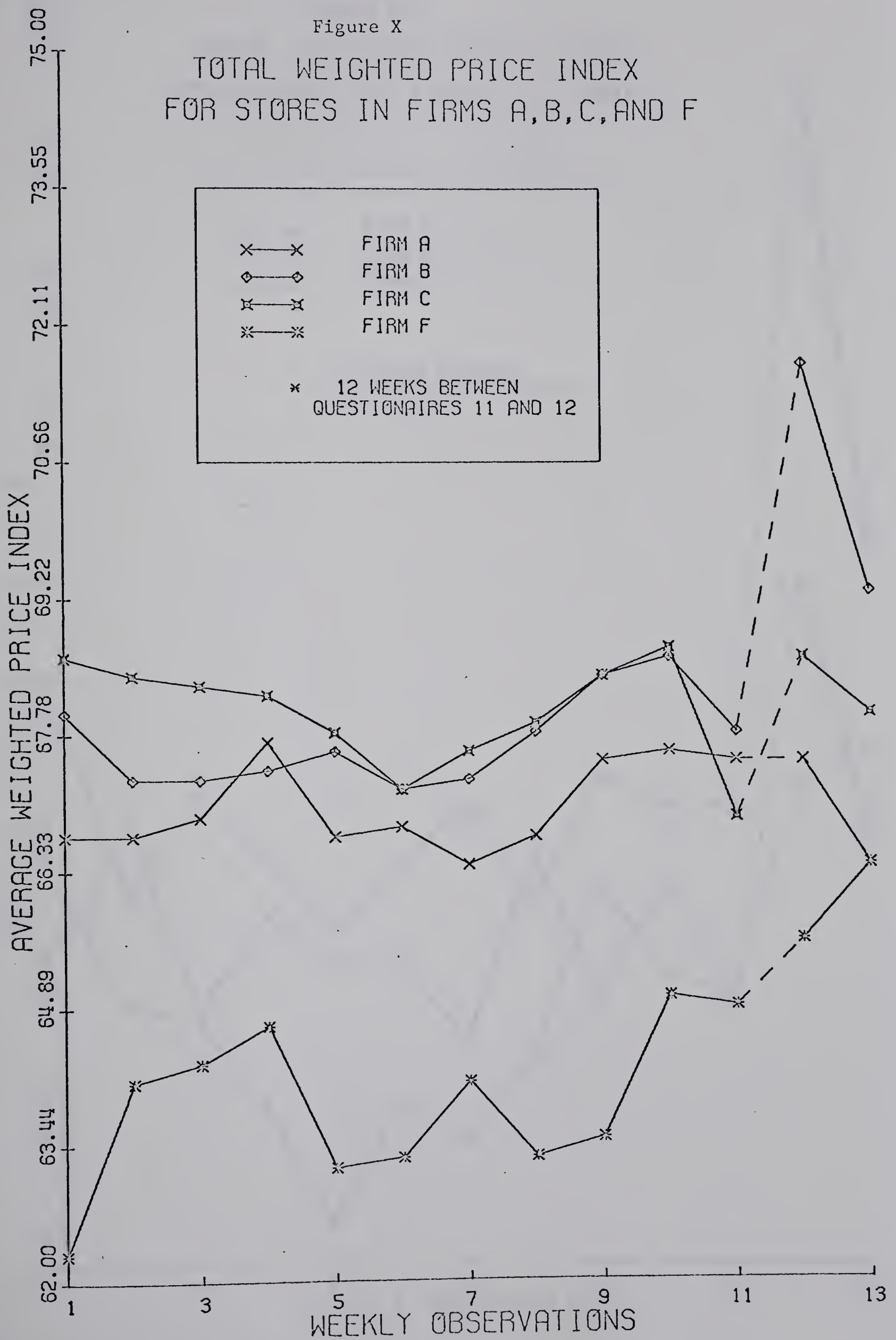
Figure XI

TOTAL WEIGHTED PRICE INDEX
FOR STORES IN FIRMS D, E, AND G

Figure XII

TOTAL WEIGHTED PRICE INDEX
FOR STORES IN UNDERPRIVILEGED
AND AFFLUENT SECTORS
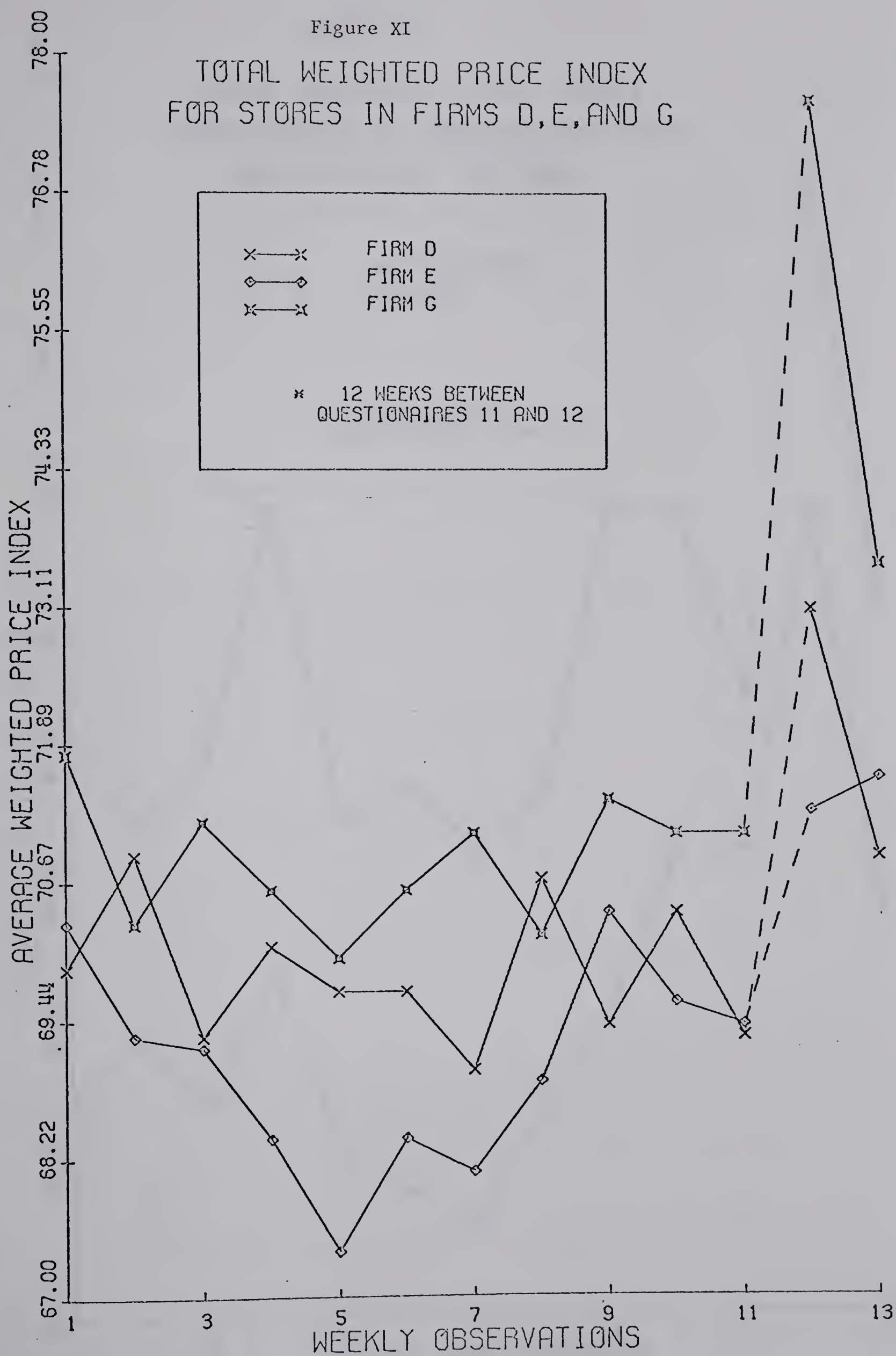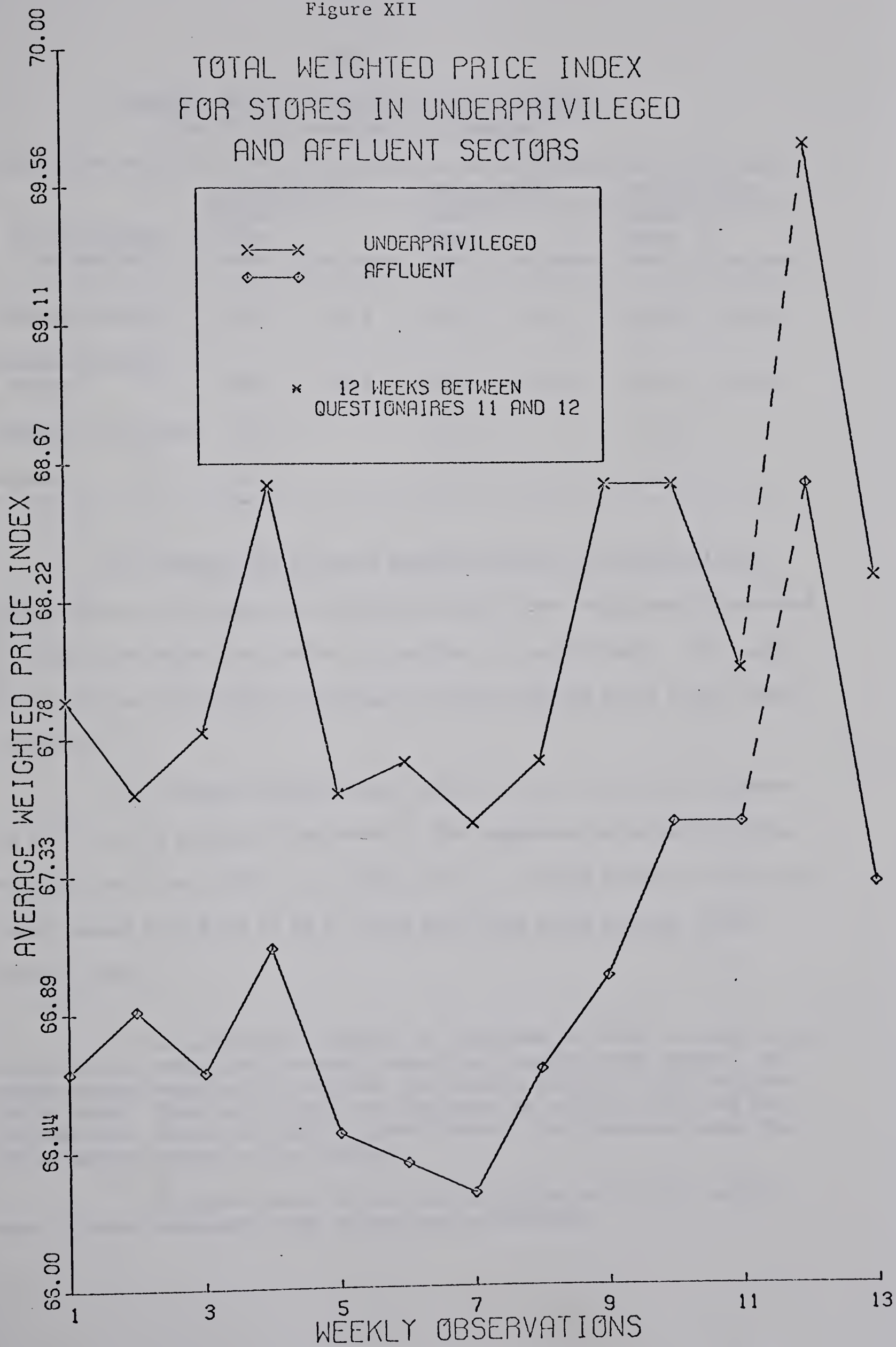
Table 9

WEIGHTED PRICE AND VARIANCE LEVELS COMPARED
FOR TWO SOCIO-ECONOMIC CATEGORIES

Socio-Economic Categories	All Products		Meat Items		Staple Items	
	Weighted Price Index	Variance	Weighted Price Index	Variance	Weighted Price Index	Variance
Affluent Sector	67.0	83.3	22.0	86.2	45.0	82.6
Underprivileged Sector	68.1	76.3	22.4	77.3	45.7	75.9
Maximum Difference	1.9		0.4		0.7	
Percent	1.6		1.8		1.5	

The Examination of Price Behavior Within an Individual Food

Chain--Stores and regions pertaining to Firm A were individually examined

to learn more about the conduct activities of a major chain. The appro-

priate stores were ranked according to their weighted price index levels

(Table 10).[1]

The average weighted price index for Firm A was 67.0 compared

to 67.4 for all stores in the study.[2] The aggregate price for the firm

ranged from a low of 61.0 to a high of 67.7. In week number 11 the price

index ranged from 63.9 to 69.6, being more than eight percent of the

average level.

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[1] The advertised specials of each week on items included in the
questionnaire were simultaneously ranked and compared with stores. The
weekly advertisements were weighted and summed, giving a total weighted
price index. This price index was considered as another store and com-
parisons were made accordingly. Advertisements are discussed under Non-
Price Behavior later in the chapter.

[2] The three lowest priced stores of Firm A--11, 12, and 13--
were situated extremely close to discount operations.

Table 10

FIRM A STORES RANKED OVER 13 WEEKS (INCLUDING ADVERTISEMENTS)[1]

Week	Weighted Price Index	Range	Index Rank																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	66.7	65.1 – 68.8	15	9	13	12	8	3	6	17	4	5	11	2	18	1	16	7	10	14
2	66.6	65.3 – 67.5	13	17	12	11	5	3	2	7	1	6	10	18	9	8	4	14	16	15
3	66.8	65.6 – 67.7	17	16	8	13	11	5	15	4	7	12	1	18	3	10	2	14	6	9
4	67.6	66.0 – 69.0	17	12	11	13	16	1	7	15	2	5	18	4	3	6	14	10	9	8
5	66.7	65.4 – 68.2	12	11	17	7	8	5	9	16	6	14	2	18	13	10	3	1	4	15
6	66.7	64.9 – 68.5	10	11	12	16	17	7	2	1	18	3	15	13	4	14	9	6	8	5
7	66.3	65.2 – 66.9	17	12	13	5	2	11	15	3	18	6	1	10	16	14	7	9	8	4
8	66.7	64.6 – 68.6	12	13	11	17	5	6	16	8	9	15	18	10	7	2	14	1	3	4
9	67.4	65.2 – 69.4	13	12	17	11	15	7	6	18	8	4	2	1	5	3	16	14	9	10
10	67.6	65.3 – 69.4	13	11	17	8	7	.2	15	3	5	12	18	1	4	16	6	14	10	9
11	67.4	63.9 – 69.6	17	13	8	12	7	14	1	5	4	18	6	15	9	2	3	10	16	11
12	67.3	65.5 – 71.1	17	15	4	6	13	3	12	7	18	2	5	11	14	1	16	9	10	8
13	66.4	65.1 – 68.1	2	13	1	3	17	6	18	8	12	7	14	5	4	15	9	16	11	10
Avg.	67.0	61.0 – 67.7	17	13	12	11	7	2	15	18	6	5	1	3	16	8	4	9	14	10

1 Stores are numbered 1 to 16 inclusive. Number 17 represents total weekly advertisements and number 18 is the 16-store average.

Geographically Firm A stores in the east region of the city exhibited the lowest price index levels, while simultaneously being characterized by the highest price variance level in relation to other geographical areas (Table 11). Meat price volatility was almost twice the corresponding figure for staple items. In other regions of the city the meat and staple price variances for Firm A approached equality. The maximum difference in percent between staple price index levels among stores in the east was more than three times the corresponding value calculated for meat items. The extended presence of the discount operation in the center of the east region has possibly enhanced the degree of competition in that area. If such is the case, this higher degree of retail competition may be a significant element in explaining the large number of price changes and high price volatility as well as the comparatively extreme percentage difference between prices of similar items in different stores at identical times in that area. No other area of Edmonton has been subjected to discount pricing strategies to the extent experienced by this region.

Conduct Under Highly Competitive Market Conditions--Firms situated geographically close together were individually analyzed in an effort to learn more about the competitive behavior of retail food outlets under such circumstances. Two combinations were chosen for analysis. In the first combination store number 19, a discount operation, was compared with store number 20 of Firm A. In the second combination store number 27, another discount operation, was compared with store number 23, also affiliated with Firm A. Results of the comparisons are found in

Table 11

REGIONAL WEIGHTED PRICE INDEX AND VARIANCE
COMPARISON OF FIRM A STORES

Store	Region	Total Food Index				Meat Index		Staple Index	
		Level	Rank	Var.[1]	Rank	Level	Var.	Level	Var.
1	West	67.0	9	31.1	2	21.8	41.0	45.2	26.8
2	West	66.9	5	42.6	3	21.9	54.7	45.0	37.2
3	West	67.1	10	44.3	4	22.0	67.2	45.1	34.1
5	West	67.3	13	53.4	8	22.2	56.2	45.1	52.2
Average	West	67.2	3	15.0[2]	1	22.0	12.9	45.1	16.0
Maximum Difference In Percent[3]		0.6				0.1		0.0	
6	North	67.0	8	56.3	9	21.8	62.2	45.2	53.5
7	North	67.0	7	50.1	6	21.8	53.3	45.2	48.5
10	North	66.8	4	29.9	1	21.8	54.4	45.0	18.3
11	North	67.3	12	95.9	16	21.9	86.6	45.4	100.4
Average	North	67.1	2	31.2	2	21.8	29.5	45.3	32.0
Maximum Difference In Percent		0.7				0.0		0.1	
25	South	67.6	15	47.3	5	22.2	63.4	45.4	39.5
14	South	67.6	14	70.4	13	22.2	77.6	45.4	67.0
15	South	67.8	16	69.1	12	22.1	60.8	45.7	73.1
23	South	65.5	1	52.6	7	21.3	70.5	44.2	43.9
Average	South	67.2	4	39.2	3	22.0	44.1	45.2	36.9
Maximum Difference In Percent		3.4				5.0		3.3	
18	East	66.6	3	82.1	14	21.8	115.4	45.8	66.5
20	East	66.0	2	66.6	11	21.7	138.9	44.3	34.0
28	East	67.0	6	83.7	15	22.0	78.2	45.0	86.1
29	East	67.2	11	61.2	10	21.9	60.5	46.3	61.6
Average	East	66.7	1	52.7	4	21.9	60.2	44.8	33.0
Maximum Difference In Percent		1.8				1.4		4.5	
Total For All Regions		67.0		49.2		22.1	52.7	44.9	47.6
Maximum Difference		0.5				0.2		0.5	
Maximum Difference In Percent		0.1				0.1		1.1	

[1] Var. means variance.

[2] This figure is not the average variance of the four stores but is the total weighted price index variance of the west region.

[3] Maximum percent difference is computed from the ratio of weighted price difference to the mean at the four individual store index price levels.

Tables 12 and 13. In both comparisons individual store prices were
not only low compared to the rest of the city but were very similar
for either the total weighted index or individually for meat and/or
staple items. The total weighted index level of one store did not
vary more than 6.0 percent from the corresponding level exhibited by
the near competitor. The discount operations exhibited more volatile
prices in staple items and, consequently, for the total food basket.
Conversely, both Firm A stores had lower price variance levels for
all item categories with one exception. Store number 20 had volatile
meat prices consistent with Firm A stores in the east region of Edmonton.

The discount operations ranked lower in aggregate price
levels than their competitors from Firm A almost consistently for the
initial 11 weeks of the price survey. During the twelve-week interval
between weeks 11 and 12 of the price survey, food prices throughout
Edmonton generally rose, beef products most noticeably. In week number
12, when the survey was recontinued, the stores in Firm A were priced
higher but exhibited a decreasing trend into week 13. The discount
stores, however, showed a considerable increase in prices in week 12
over the initial 11-week average and by week 13 prices continued to
increase, being well above their competitors in both cases. These
results are indicated by Figures XIII and XIV, which individually
rank the two competitive combinations.

Invariably the neighborhood market conditions, especially
between stores situated very close together, were more competitive in
nature than those existing in the larger market categories such as
geographical regions or between chains. The cross elasticities of

Table 12

TWO-STORE COMPARISON OF STORES NUMBER 19 AND 20

Weeks	Store Number 19					Store Number 20				
	All Products		Meats		Staples	All Products		Meats		Staples
	Weighted Price Index	Rank	Weighted Price Index	Rank	Weighted Price Index	Weighted Price Index	Rank	Weighted Price Index	Rank	Weighted Price Index
1	63.9	2	21.9	9	41.0	66.4	7	21.7	6	44.7
2	64.8	2	21.6	10	43.2	65.9	5	21.5	7	44.4
3	64.6	2	21.5	7	43.1	66.8	14	24.3	23	43.9
4	65.2	1	21.8	4	43.4	66.3	5	22.1	9	44.2
5	63.5	1	21.5	6	42.0	65.4	4	21.1	3	44.3
6	62.1	1	21.6	10	40.5	65.6	6	21.6	8	44.0
7	64.1	1	21.8	16	42.3	65.3	4	21.2	3	44.1
8	64.1	2	21.4	11	42.7	64.6	3	20.9	2	43.7
9	63.6	1	21.5	5	42.1	65.3	5	21.1	3	44.2
10	65.1	1	22.0	12	43.1	67.6	11	22.8	24	44.8
11	65.9	4	22.1	13	43.8	67.1	7	22.4	22	44.7
12	67.0	9	22.9	16	44.1	66.7	8	22.4	8	45.3
13	68.1	20	21.9	17	46.2	66.4	7	21.7	11	44.7
Average	64.4	2	21.7	5	42.7	66.0	5	21.7	4	44.3
Total Variance	134.9		46.0		157.6	66.6		138.9		34.0

Table 13

TWO-STORE COMPARISON OF STORES NUMBER 23 AND 27

Weeks	Store Number 23					Store Number 27				
	All Products		Meats		Staples	All Products		Meats		Staples
	Weighted Price Index	Rank	Weighted Price Index	Rank	Weighted Price Index	Weighted Price Index	Rank	Weighted Price Index	Rank	Weighted Price Index
1	66.4	8	22.6	20	43.8	63.1	1	20.1	1	43.1
2	65.3	4	21.5	8	43.8	65.6	1	21.2	1	42.8
3	66.4	7	22.0	19	44.5	66.6	1	20.9	2	43.7
4	67.0	8	22.9	24	44.1	65.3	2	21.8	5	43.5
5	66.7	13	22.0	17	44.7	64.4	2	20.8	1	43.6
6	67.0	14	21.4	5	45.6	65.1	4	21.0	1	44.2
7	65.7	5	21.6	8	44.1	64.8	3	21.0	2	43.8
8	64.9	4	20.7	1	44.2	63.2	1	21.0	3	42.2
9[1]	65.3	4	20.5	1	44.8	65.1	3	21.2	4	43.9
10	65.3	2	20.6	1	44.8	65.6	4	21.0	2	44.7
11	65.1	2	20.6	1	44.4	65.2	3	20.8	2	44.4
12	66.5	7	22.0	4	44.5	65.6	2	23.1	18	42.5
13	65.5	3	21.6	10	43.9	66.9	14	21.8	13	45.1
Average	65.5	4	21.3	3	44.2	64.8	3	21.2	2	43.6
Total Variance	52.6		70.5		43.9	114.7		76.3		132.1

1 In week number 9 of the survey store number 23 changes from its normal retail operation to one that exhibited warehouse characteristics. The price drop is evident in the table.

Figure XIII

STORES NUMBER 19 AND 20
A RANKED COMPARISON
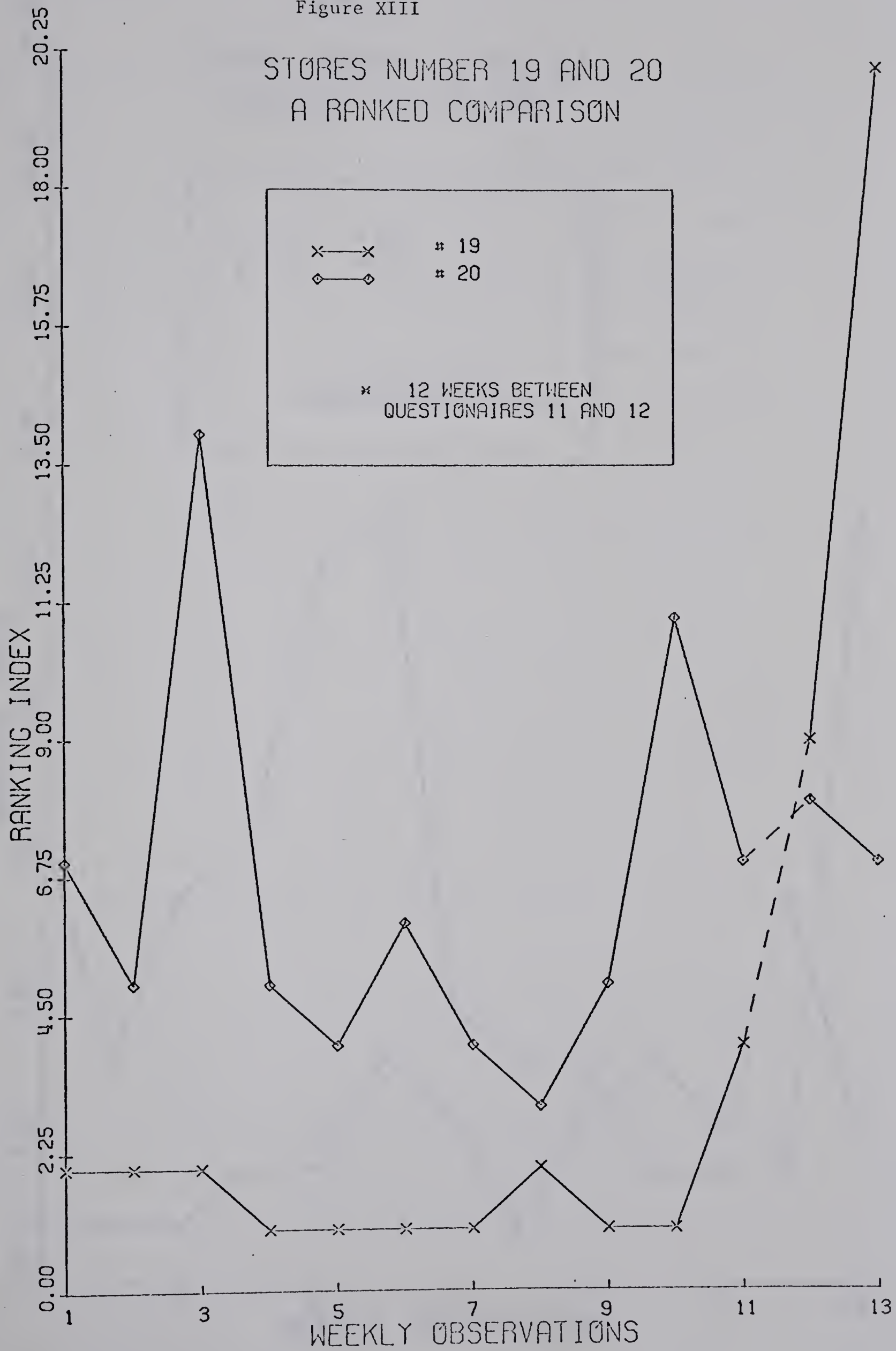
Figure XIV

STORES NUMBER 23 AND 27
A RANKED COMPARISON

x———x   # 23
◇———◇   # 27

*   12 WEEKS BETWEEN
QUESTIONAIRES 11 AND 12

RANKING INDEX

WEEKLY OBSERVATIONS
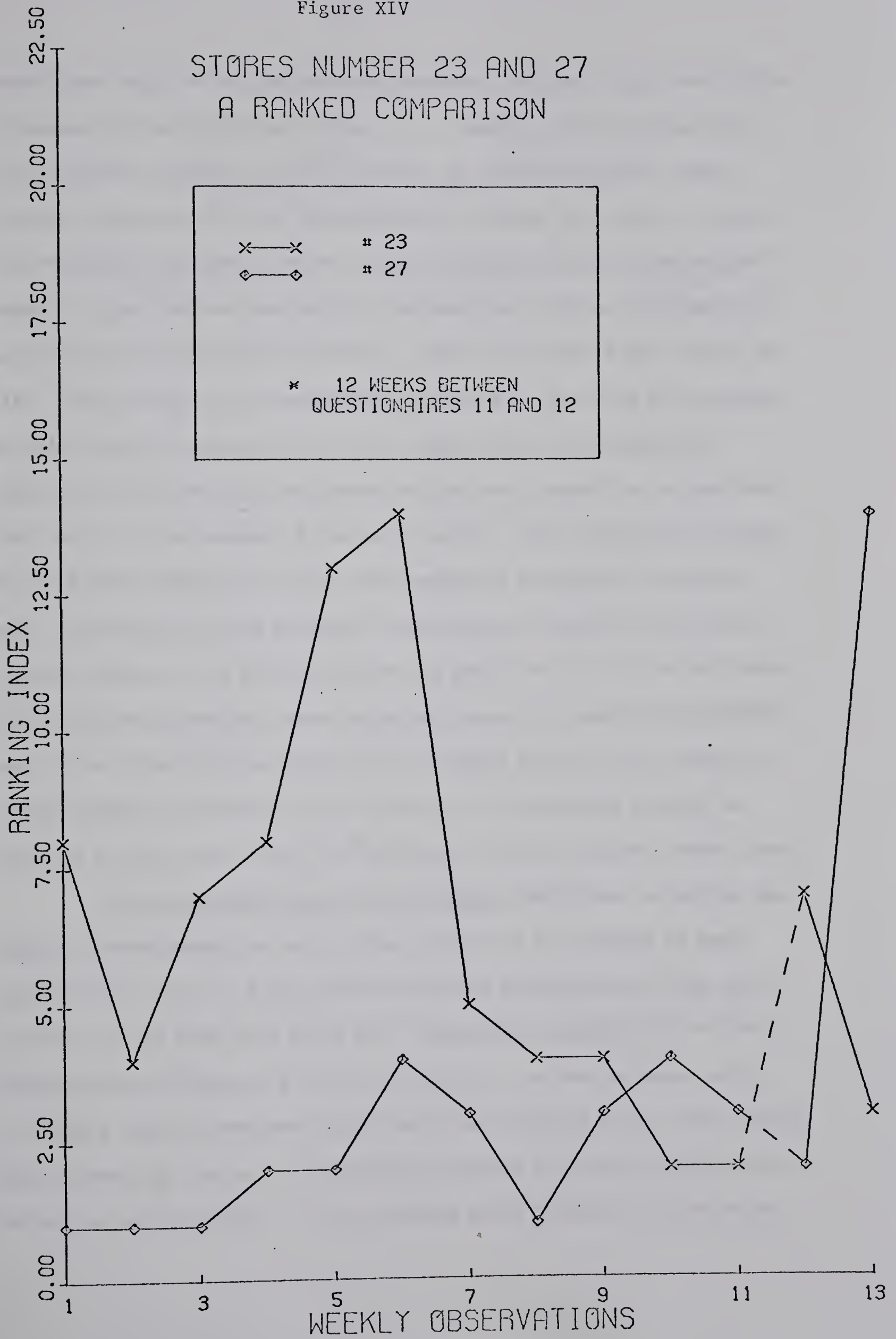
demand were high in the neighborhood markets, implying high elasticities

of demand for the individual firms. As a result, price strategy was a

very important element of market conduct in these particular areas,

far more important than in the metropolitan market as a whole. However,

the relatively inelastic demand for the individual chains discouraged

drastic price fluctuations at the firm level but did not preclude more

extreme price fluctuations in smaller, well designated areas within the

firm. Advertising at the metropolitan level was practiced in an effort

to shift the firm demand curve to the right, while simultaneously

decreasing the elasticity of demand in the more competitive situations

that exist in the subsets of the metro market. The theoretical concept

of the kinked demand curve fits this empirical situation reasonably

well. Although both low and high elasticities of demand exist, theore-

tically adding to and deterring from the positive effect of advertising,

the conditions promoting advertising as a means of competition--specifi-

cally, the relatively low elasticity of demand faced by the firm--are

strong enough to warrant its continued use. Advertising results in

benefits to the firm at both the aggregate and the isolated market level.

Monitoring New Store Price Strategy--Individual attention was

given to store number six as a direct result of its closing in week

eight of the survey. A new store was opened in week nine in the same

vicinity by the same firm (Firm A). Statistics regarding the various

weighted price changes are found in Table 14. In the two weeks prior

to closing (weeks seven and eight) the total weighted price index ranked

approximately 60 percent of the average ranking position for that store

during the entire survey. In the opening week, however, the new store

Table 14

NEW STORE PRICING ACTIVITIES

Week	Weighted Price Index	Rank[1]	Weighted Meat Price Index	Rank	Weighted Staple Price Index
1	66.7	12	22.3	16	44.4
2	66.3	7	21.2	3	45.1
3	66.6	10	21.5	5	45.2
4	67.6	15	22.5	16	45.1
5	66.3	8	21.7	12	44.5
6	68.4	26	22.1	23	46.3
7	66.0	6	21.5	6	44.5
8	66.1	7	21.2	4	44.9
9	67.0	17	22.3	17	44.7
10	66.6	12	22.3	18	44.4
11	66.3	12	21.5	4	44.8
12	67.6	12	22.1	7	45.6
13	67.8	12	21.9	15	44.9
Average	67.0	11	21.8	9	45.2

[1] Ranked in comparison with all other stores in the survey.

had a weighted price index that ranked over 150 percent of the 13-week

average position; that is, it moved from an average ranking position

of 11 among 29 stores to 17. The price index levels and relative

ranking positions are illustrated in Figure XV. Meat items in weeks

nine and ten were raised in price to the extent that their relative

ranking level was approximately 200 percent above the 13 week level

for all stores.

Meat Analysis--Meat products studied in the questionnaire were

examined individually and as a group with specific attention given to

beef products. It is evident from the results presented in Table 15

that stores exhibiting the lowest meat price index are those with the

lowest total food price index previously ranked in Table 2. The range

in meat prices was, however, greater in magnitude than the corresponding

range for the total food basket. Meat prices ranged from a low index

level of 20.1 to a high of 26.2, resulting in a difference of 27.0

percent of the average. (In week number 12 alone the weighted price

index for meat varied approximately 18 percent above or below that

week's average.)

Meat prices largely contribute to the relative ranking posi-

tions of an individual store in relation to others in the city. To

demonstrate this characteristic, stores 19 and 20, and 23 and 27, were

ranked, using meat items in Figures XVI and XVII. Despite the fact that

these two specific combinations of stores have very similar prices

throughout the survey, a small change in meat prices is dramatically

reflected in the relative ranking position of the individual store.

Table 15

COMPARISON OF MEAT ITEMS FOR ALL STORES

Week	Weighted Price Index	Range	Index Rank																											
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
1	22.3	20.1-23.8	27[1]	21	26	1	3	20	28	5	19	2	13	11	29	7	14	6	22	16	18	23	10	15	4	17	25	24	8	12	9
2	22.0	21.2-23.6	27	26	6	7	3	10	20	23	14	19	11	1	2	18	21	8	12	15	28	4	29	16	25	13	5	17	22	24	9
3	22.0	20.7-23.4	26	27	11	16	6	29	19	28	2	3	21	1	15	4	14	25	5	10	23	18	22	13	20	12	7	17	9	24	8
4	22.5	21.4-23.6	26	16	21	19	27	29	13	1	20	28	4	3	2	10	18	6	25	7	15	11	5	24	14	23	8	17	12	9	22
5	21.9	20.8-23.2	27	26	20	18	10	19	8	16	13	29	11	6	14	4	7	15	23	25	2	21	28	12	3	1	5	22	9	24	17
6	21.8	21.0-23.1	27	10	26	18	23	21	25	20	4	19	1	2	11	15	7	8	29	14	3	13	16	5	6	28	22	12	24	9	17
7	21.9	21.0-23.2	26	27	20	16	29	6	28	23	11	18	2	7	10	21	3	19	25	1	4	15	5	14	13	24	22	12	9	8	17
8	21.9	20.7-23.8	23	20	27	6	26	7	11	29	18	15	19	14	28	10	16	2	25	12	21	8	13	4	1	22	17	3	5	24	9
9	22.1	20.5-23.3	23	26	20	27	19	10	28	18	7	8	21	2	1	29	11	4	6	5	25	3	16	9	22	24	17	14	13	15	12
10	22.3	20.6-23.7	23	27	18	21	26	28	11	7	10	3	8	19	13	2	29	1	4	6	5	25	15	16	17	20	12	14	24	9	22
11	22.2	20.6-23.5	23	27	26	6	25	11	7	10	24	2	1	3	19	15	21	5	22	4	13	8	29	20	16	14	18	12	28	9	17
12	23.1	21.8-26.2	28	18	7	23	5	3	6	20	26	10	1	2	29	15	25	19	24	27	13	14	11	8	22	21	4	17	16	9	12
13	22.1	21.1-23.9	18	10	25	7	28	1	2	5	15	23	20	14	27	29	6	11	19	22	3	26	16	21	24	13	8	9	4	12	17
Avg.	22.1	21.2-23.4	26	27	23	20	19	10	18	7	6	2	11	29	21	28	3	15	25	5	14	16	4	13	8	24	22	12	17	9	
Firm			F	F	A	A	F	A	A	A	A	A	A	A	A	B	A	A	A	A	A	A	A	A	B	B	E	B	C	G	D
Region			W	S	S	E	E	N	W	N	N	E	W	N	N	E	E	N	S	S	S	W	S	S	W	N	N	E	N	E	N

1 Store numbers used are identical to those in Appendix A, Table 1.

Figure XV

NEW STORE PRICE INDEX LEVELS
AND RANKING POSITION

Figure XVI

STORES 19 AND 20 RANKED
MEAT ITEMS
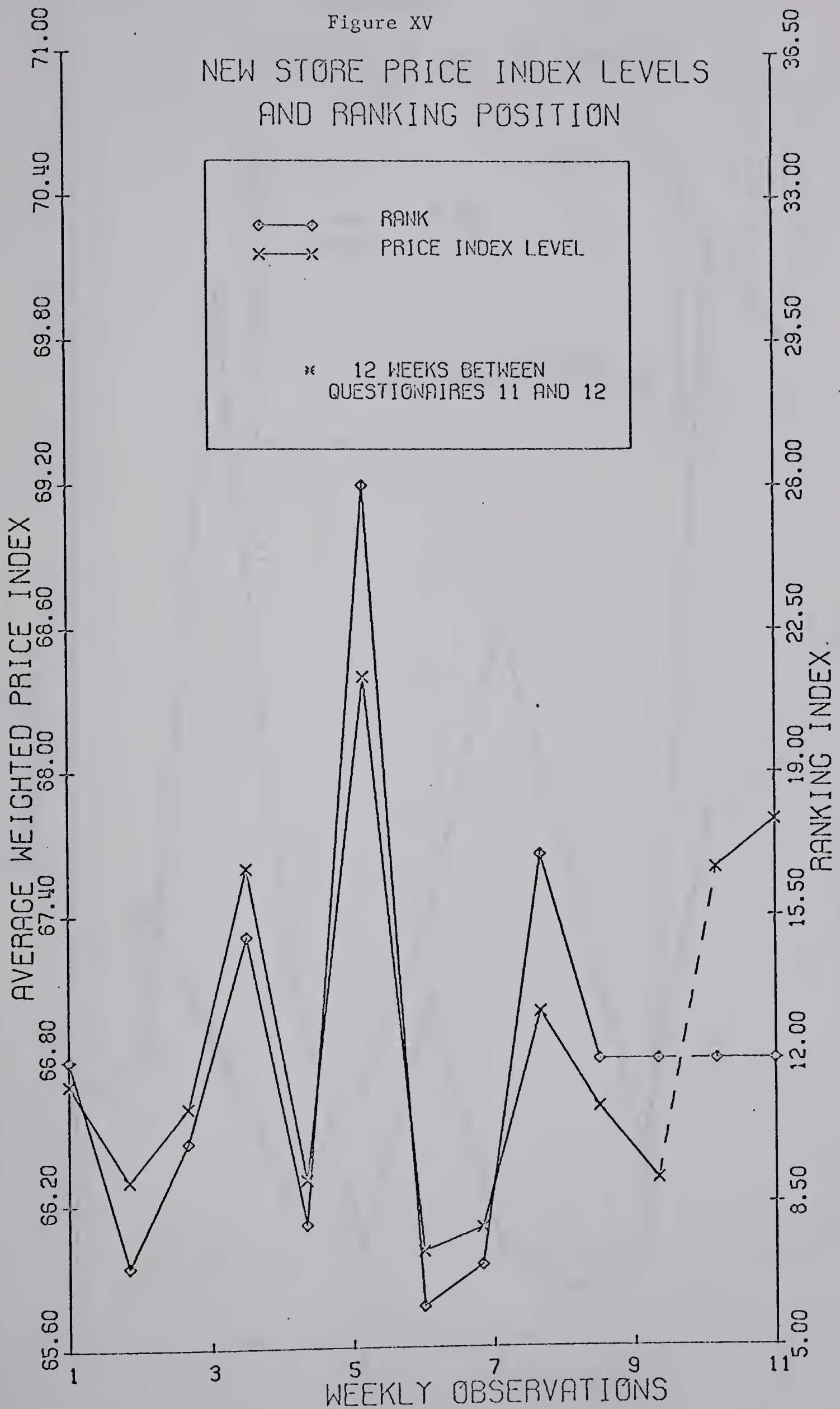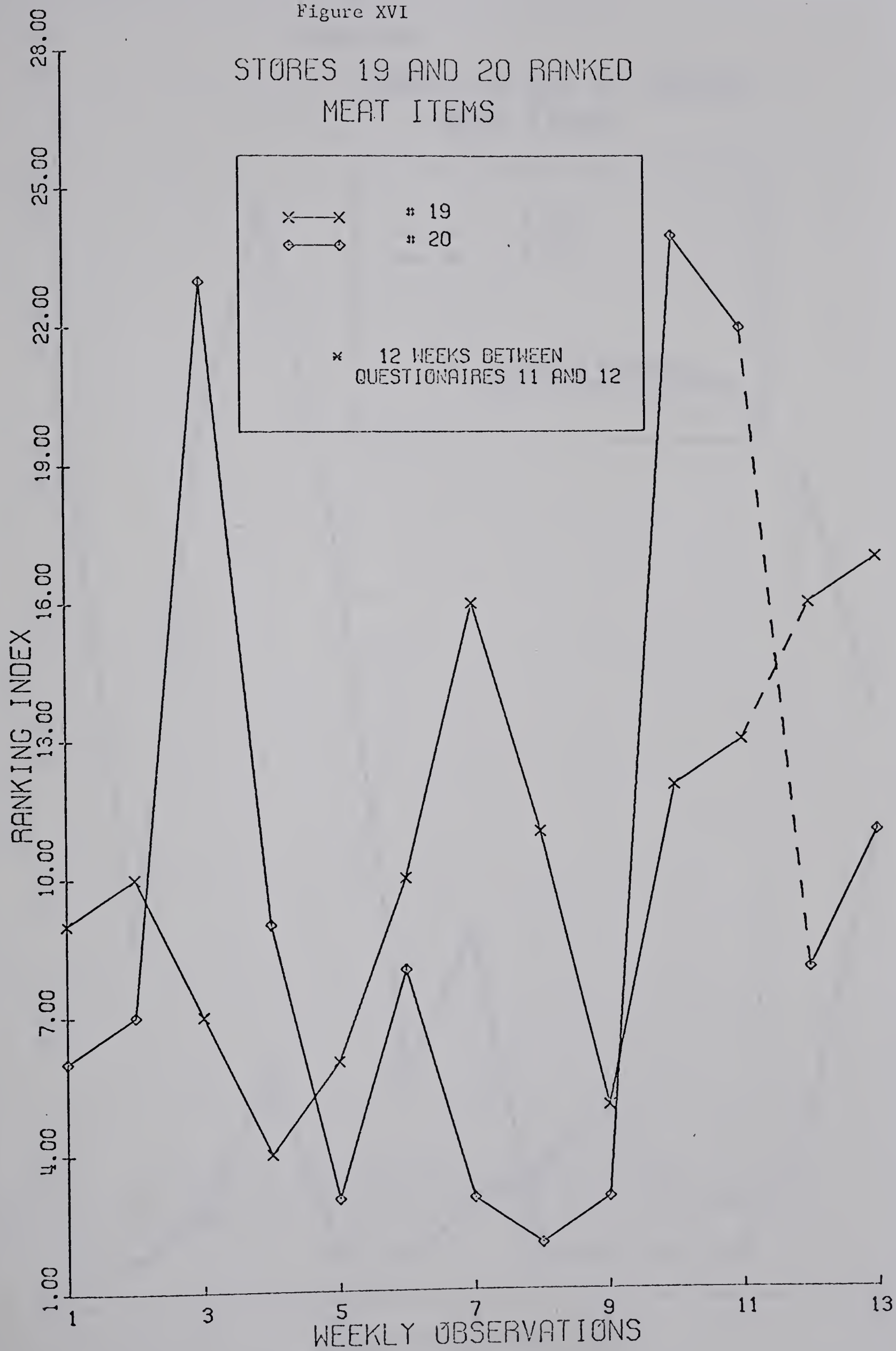
Figure XVII

STORES 23 AND 27 RANKED MEAT ITEMS
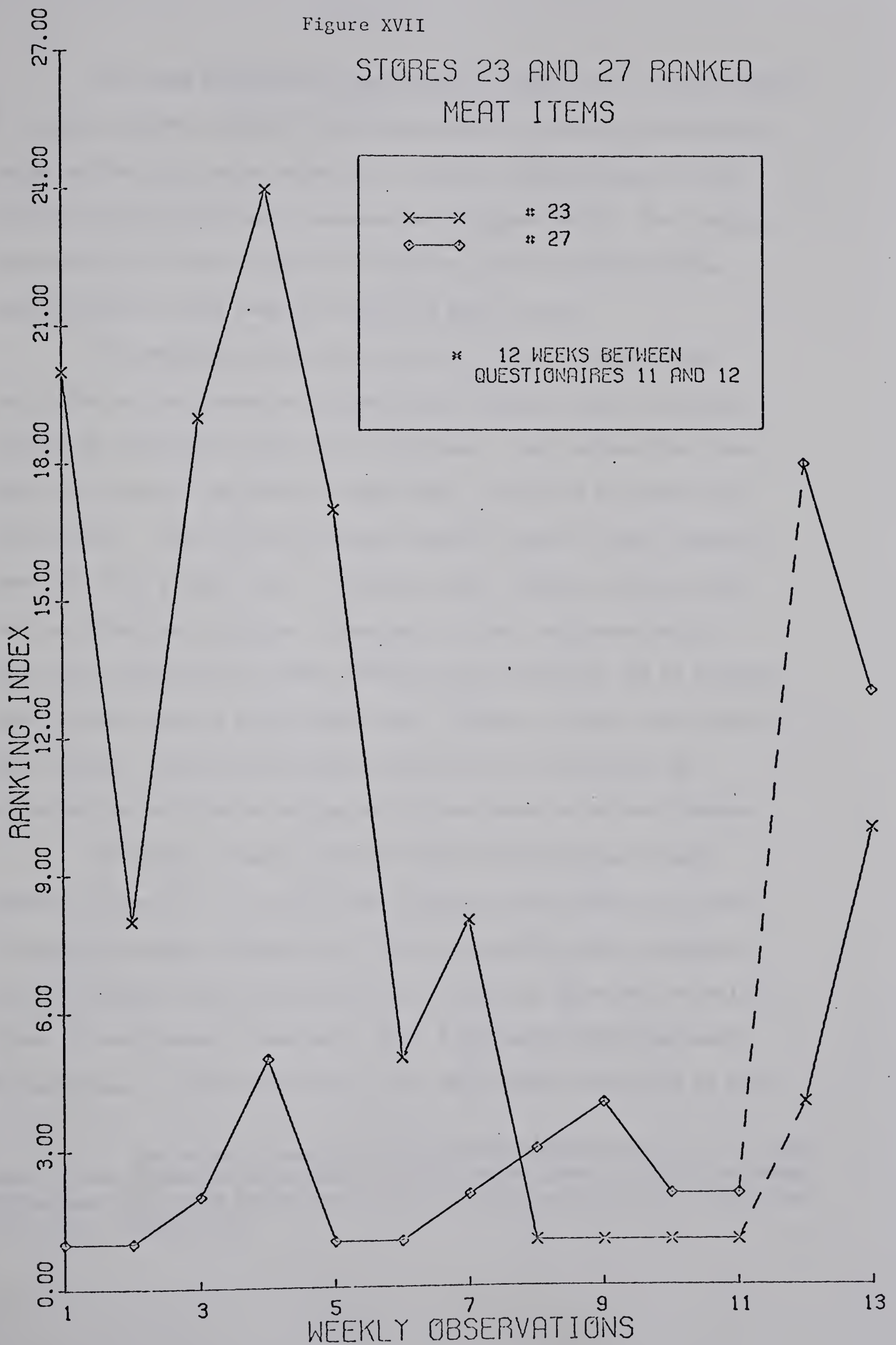
The same phenonemon occurs within a single firm. Store numbers 5, 11, 23, and 28 of Firm A, all representing a different geographical region of the city, were ranked with respect to meat items, and the results are diagramatically represented in Figure XVIII. The ranking positions of the four stores fluctuated to greater extremes while corresponding to only nominal changes in meat prices.

The weighted price variances for all meat products were calculated and are presented in Table 16. Several items were characterized by relatively large price variances. Item numbers four, one, eight, two, seven, and three, respectively, exhibited the most volatile prices.[1] Firm A often had more volatile prices on meat items of generally high quality such as steaks, roasts, chops, cottage rolls, and top price line products. Conversely, Firm B reflected fairly high price volatility on items that were less expensive and of somewhat lower quality such as stew, ground beef, chicken, turkey, and private label items. Firm D had low price variances but did reflect an occasional volatile price on top price line items or national brands.

To further examine price-variance relationships in meat products, Firms A, B, C, and D were compared using items one to nine of the questionnaire (Table 17). Firm A ranked the least expensive for all products, while simultaneously reflecting relatively volatile prices in most cases. Conversely, Firm D generally ranked expensive in comparison to the other firms, while exhibiting a low level of price

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[1] The actual foods involved exhibiting the high price variances were: blade roast, blade out (4); sirloin steak, bone in (1); loin chops, center cut (8); round steak bone in (2); sliced beef liver (7); and prime rib roast, standing (3).

Figure XVIII

STORES 5,11,23,AND 28
RANKED MEAT ITEMS

STORE NO. 5
STORE NO. 11
STORE NO. 23
STORE NO. 28

12 WEEKS BETWEEN
QUESTIONAIRES 11 AND 12

RANKING INDEX

WEEKLY OBSERVATIONS
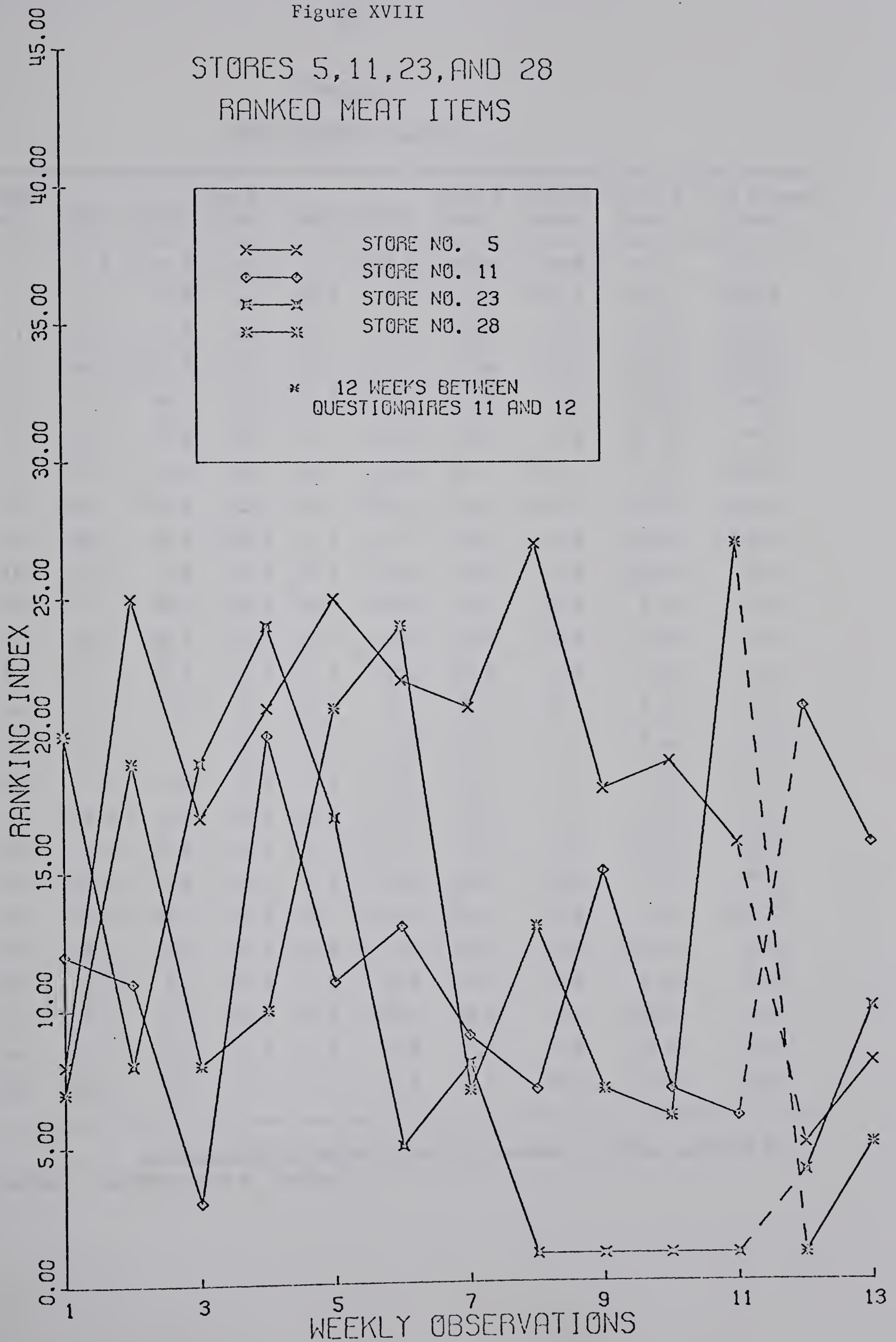
Table 16

MEAT VARIANCE ANALYSIS

| Item | Firm A | | | | | Firm B | Firm C | Firm D | All Stores |
No.[1]	North	South	East	West	Total	Total	Total	Total	Total
1	8.8	134.5	321.3	4.4	192.8	152.5	38.0	78.7	259.4
2	9.8	77.8	36.1	32.2	67.4	135.4	46.8	241.6	218.9
3	27.2	31.3	30.7	14.4	32.2	96.0	37.4	5.8	118.6
4	154.8	182.8	317.2	72.2	278.9	62.4	17.0	59.4	268.0
5	0.9	46.4	91.8	4.4	51.1	57.0	4.5	0.9	86.9
6	22.1	45.8	64.3	5.7	45.7	68.0	9.8	34.2	80.8
7	19.5	25.4	51.0	44.8	45.3	51.5	127.2	0.0	155.6
8	226.2	229.6	17.4	97.0	178.1	85.4	102.5	43.6	223.3
9	38.2	80.5	222.2	1.6	111.7	60.2	93.8	23.4	138.9
10	22.9	2.8	3.4	0.4	10.3	17.9	33.8	28.8	35.6
11	11.1	28.3	30.3	8.9	29.3	9.7	11.9	3.5	26.6
12	30.3	26.5	41.2	0.0	42.3	22.6	31.5	0.0	46.2
13	10.1	36.2	8.3	7.1	24.2	11.8	3.1	3.3	27.1
14	1.2	2.5	2.5	0.2	2.1	2.3	0.3	7.1	7.7
15	8.7	1.7	5.3	2.1	6.9	12.9	6.7	8.4	13.4
16	5.2	13.4	5.9	3.6	14.3	6.8	5.1	3.9	20.2
17	31.8	9.3	54.1	5.4	47.9	37.1	9.1	6.3	57.1
18	2.7	12.0	14.1	2.5	11.1	6.1	3.4	11.7	17.0
19	11.0	8.6	22.1	0.6	29.1	22.7	15.6	0.6	39.8
20	65.3	80.3	24.5	5.7	55.4	107.2	15.0	7.4	106.5
21	12.3	65.1	32.2	8.6	38.4	82.6	11.0	23.1	76.0
22	6.2	3.5	41.0	5.3	18.3	6.0	16.8	7.4	20.2
23	8.2	8.6	124.2	5.5	48.5	86.6	0.3	88.0	70.0
24	1.1	14.6	8.1	0.4	8.9	4.4	9.1	17.5	15.6
25	10.0	4.7	4.9	0.0	6.3	6.4	38.5	5.6	76.5

[1] Item numbers in this column correspond to those used in the survey. See Appendix A, Table 2.

Table 17

FIRMS A, B, C, AND D RANKED USING A 13-WEEK
AVERAGE FOR MEAT ITEMS ONE TO NINE

Item No.[1]	Weighted Price Index Ranking				Weighted Price Variance Ranking			
	1	2	3	4	1	2	3	4
1	A	C	D	B	D	C	B	A
2	A	C	B	D	C	A	B	D
3	A	D	C	B	D	A	C	B
4	A	C	B	D	C	B	D	A
5	A	D	B	C	D	C	B	A
6	A	D	B	C	C	D	A	B
7	A	C	B	D	D	A	B	C
8	A	B	C	D	D	B	C	A
9	B	A	D	C	D	B	C	A

[1] See Table 16.

variance. Because Firm A is the largest chain in the market, it may

well experience lower cost structures permitting both the extensive

use of advertising and lower food prices than other firms.[1] Within

Firm A, however, prices may not follow this pattern and may rise with

increased price volatility or advertisements as previous calculations

have indicated. Consequently, the delineation of the aggregate market

into its relevant market subsets is apparently a necessary prerequisite

for improved understanding and rationalization of retail price and

non-price strategy.

A 29-store average of the weighted price index levels for

beef products is presented in Table 18. The most noticeable feature

concerning beef products is the wider range in prices. The maximum

differences between the high and low levels were calculated and con-

verted to percentages of the mean index. The results show the prices

ranged from a low of 35.6 percent to a high of 100.0 percent of the mean

index. Beef items not only play a significant role in allocating the

individual consumer's food budget but apparently play an equally impor-

tant role in the price strategy used by retail outlets, as indicated

by the relatively wide range of price differences. Submitted to such

pricing tactics, the consumer may find it extremely difficult to relate

one price against another in an effort to choose his best food bargaining

alternative.

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[1] Cost structures generally tell us little about consumer prices, as the retail price level depends largely on management, competition, and timing.

Table 18

A 29-STORE AVERAGE OF WEIGHTED PRICE INDEX LEVELS FOR BEEF PRODUCTS

Item No.[1]						Weeks							13 Week Average	Maximum Difference in Percent
	1	2	3	4	5	6	7	8	9	10	11	12	13		
1	2.11	1.96	1.98	1.96	1.86	1.90	1.95	1.95	1.96	1.99	1.94	2.20	2.05	1.99	
Range	1.61–2.38	1.69–2.38	1.86–2.38	1.86–2.38	1.52–2.21	1.86–2.21	1.80–2.38	1.86–2.21	1.78–2.21	1.52–2.21	1.85–2.21	2.09–2.48	2.02–2.14		48.0
2	1.81	1.61	1.71	1.61	1.58	1.59	1.62	1.62	1.59	1.60	1.63	1.70	1.51	1.63	
Range	1.50–1.86	1.52–1.86	1.44–2.03	1.52–2.03	1.44–2.21	1.44–2.38	1.50–1.86	1.52–1.86	1.44–2.03	1.45–1.86	1.49–2.03	1.56–2.38	1.45–1.52		49.2
3	1.62	1.59	1.58	1.66	1.62	1.58	1.54	1.56	1.65	1.63	1.66	1.69	1.62	1.61	
Range	1.52–1.69	1.52–1.69	1.52–1.86	1.45–1.69	1.45–1.69	1.50–1.69	1.35–1.86	1.49–1.69	1.52–1.69	1.33–1.69	1.52–2.03	1.56–2.21	1.54–2.21		35.6
4	1.22	1.18	1.19	1.36	1.27	1.23	1.29	1.31	1.33	1.35	1.27	1.38	1.34	1.29	
Range	1.01–1.45	1.01–1.45	1.01–1.45	1.11–1.69	1.18–1.45	.84–1.45	.84–1.45	1.01–1.69·	.82–1.62	.84–1.45	1.01–1.52	1.18–1.69	1.28–1.52		69.6
5	1.51	1.50	1.51	1.50	1.48	1.48	1.49	1.51	1.48	1.49	1.49	1.55	1.46	1.49	
Range	1.35–1.69	1.33–1.59	1.35–1.69	1.18–1.69	1.33–1.52	1.35–1.52	1.33–1.52	1.33–2.27	1.33–1.69	1.32–1.52	1.28–1.69	1.42–1.85	1.33–1.69		63.0
6	1.07	1.08	.98	1.06	1.03	1.01	.97	1.01	.97	1.02	1.04	1.16	1.02	1.03	
Range	.84–1.11	.85–1.45	.85–1.03	.67–1.11	.80–1.11	.84–1.11	.85–1.11	.85–1.15	.85–1.11	.80–1.11	.84–1.52	1.01–1.50	.99–1.35		77.3
7	.84	.83	.75	.81	.85	.84	.83	.82	.85	.87	.87	1.02	1.05	.88	
Range	.67–1.11	.67–1.01	.56–1.01	.60–1.01	.67–1.18	.67–1.01	.56–1.11	.56–1.18	.65–1.01	.63–1.18	.63–1.18	.79–1.69	.79–1.50		100.0
Total	10.18	9.75	10.70	9.96	9.69	9.63	9.69	9.78	9.83	9.95	9.90	10.70	10.05	9.92	

1 See Table 16.

Non-Price Behavior

Private Labels versus National Brands--Private label and national brand items were examined and compared both with respect to price and price volatility (Table 19). The percent price differential ranged from 9.4 to 37.5 percent, the highest level associated with canned pork and beans. The average price differential was 19 percent for the items in the comparison.

Price variance was highest for private brands in all cases but one. The exception was the national brand ice cream as it had an extremely high price variance of 304.7, compared to the private brand price variance of 175.8.

Advertising Strategy--Non-price competition in this study was primarily involved with advertising, specifically weekly newspaper advertisements. Advertisements were analyzed with respect to timing, kinds of products specialed, and the number of items specialed by a particular firm. The five major firms in Edmonton are compared in terms of the total number of meat specials advertised per week and in terms of the total weighted price index levels associated with each week (Table 20). Invariably the number of advertised specials increased at the end of each month, and this increase in advertisements was usually accompanied by a total price index that remained constant and/or increased during the same period.[1] Firm A advertised to the largest extent, compared to any other firm examined. Firm C, however, exhibited

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[1] Corresponding to the increases in advertisements, the total variance levels increased in approximately 60 percent of the cases whether using all products or meats and staples individually.

Table 19

PRIVATE LABEL ANALYSIS

Product	Price		Variance		Price Differential[1]	
	Supplier Brand	Private Brand	Supplier Brand	Private Brand	Weighted	Percent
Fresh sausage, 1 lb.	.32	.25	7.7	13.4	.07	19.8
Bacon, 1 lb.	.92	.78	20.2	57.1	.14	16.6
Weiners, 1 lb.	.57	.48	17.0	39.8	.09	16.6
Margarine, 1 lb.	.46	.41	42.6	46.2	.05	11.2
Cut green beans, 14 oz. can	.55	.51	24.6	23.4	.04	9.4
Corn niblets, 12 oz. can	.55	.50	37.8	65.7	.05	9.4
Beans with pork, 14 oz. can	.57	.39	26.5	42.2	.18	37.5
Tomato juice, 48 oz. can	.63	.51	42.6	51.7	.12	11.4
Ice cream, 3 pints	1.51	1.19	304.7	175.8	.32	23.7
Total	6.08	5.02			1.06	19.1

[1] Percent difference is computed from the ratio of weighted price difference to the mean price of supplier and private brands.

Table 20

FIRM ADVERTISEMENTS COMPARED

	Firm A			Firm B			Firm C			Firm D			Firm E		
Date	No. of Ads.	Price Index[1]	Rank	No. of Ads.	Price Index	Rank	No. of Ads.	Price Index	Rank	No. of Ads.	Price Index	Rank	No. of Ads.	Price Index	Rank
Jan. 15	36	66.7	1	25	68.0	2	19	68.6	3	18	69.9	4	15	70.3	5
22	38	66.6	1	26	67.3	2	8	68.4	3	20	70.9	5	14	69.3	4
29	40	66.8	1	21	67.3	2	13	68.3	3	21	69.3	5	15	69.2	4
Feb. 5	26	67.6	2	20	67.4	1	12	68.2	3	0	70.1	5	5	68.4	4
12	17	66.7	1	23	67.6	3	16	67.8	4	17	70.0	5	18	67.4	2
19	27	66.7	1	20	67.2	3	9	67.2	2	18	70.0	5	15	68.4	4
26	49	66.3	1	14	67.3	2	38	67.6	3	30	69.0	5	16	68.0	4
Mar. 5	50	66.7	1	22	67.8	2	11	67.9	3	18	70.7	5	21	68.9	4
12	40	67.4	1	21	68.4	3	20	68.4	2	21	69.4	4	22	70.4	5
19	23	67.6	1	20	68.6	2	15	.68.7	3	17	70.4	5	17	69.5	4
26	45	67.4	2	19	67.8	3	51	66.9	1	21	69.3	4	16	69.4	5
June 25	75	67.3	1	24	71.7	4	25	68.6	2	24	73.1	5	16	71.3	3
July 2	68	66.4	1	22	69.3	3	16	67.6	2	16	70.9	4	17	71.6	5
Average		66.7	1		68.1	3		68.0	2		70.7	4		69.9	5

1 Price Index represents the total weighted price index included in the survey in a particular week.

the largest relative change in the number of advertisements. During the interval between end of the month peaks in advertising Firm C had relatively few specials; however, at the end of the month it would quadruple in some cases the number of items advertised. In week number 7, for example, Firm C substantially increased the number of advertisements over the previous week, while simultaneously increasing the price of the total food basket to the extent that the firm's ranking position was changed from second to third highest.

With respect to the advertising strategy involved with one particular firm, refer to Table 10 regarding Firm A. Notice that number 17, the total weekly advertisement index, ranked lowest in the 13-week average. Stores in Firm A (including the 16 store average, number 18) all averaged above the advertised index level for that firm. In five out of the 13 weeks the advertising index was the lowest in the ranking index. In the remaining seven weeks it ranged from the second to the eighth position in the scale. In establishing the advertising index, store averages were used in the event a product was not advertised. Theoretically, the averages should have resulted in the advertising index being at least comparatively equal to the average of all 16 stores. If the product was not advertised, the figure used in its place was identical to the corresponding figure in the firm average, and if an item was advertised it should have been carried in the majority of stores lowering the firm average.

Figure XIX diagramatically plots the ranking positions of the advertisements for Firm A and the average for the firm. Notice the

Figure XIX

PRICE LEVEL AND ADVERTISING LEVEL
RANKED   FIRM   A

ACTUAL FIRM LEVEL
ADVERTISING LEVEL

* 12 WEEKS BETWEEN
QUESTIONAIRES 11 AND 12

RANKING INDEX

WEEKLY OBSERVATIONS
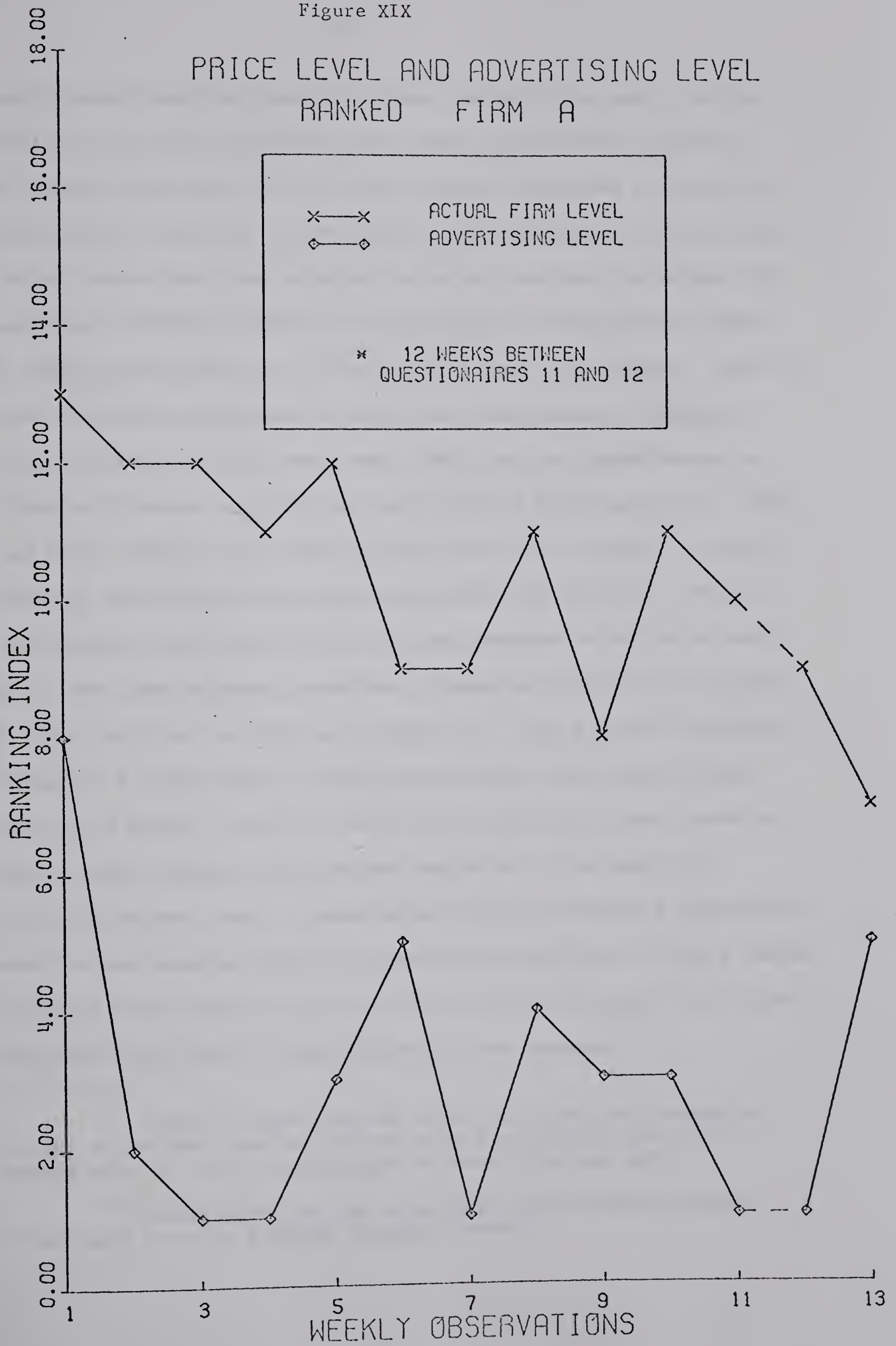
advertisement index decreases at or near the end of the month, corresponding to the normal increase in the number of advertised specials.

In contrast the average for the firm invariably increases at the end of each month and decreases in the interval. Theoretically not only should the two indexes have been relatively equal as previously explained, but should have followed somewhat the same pattern as the increased number of items specialed should be reflected in a lower firm average. Table 21 shows a five-firm comparison of individual advertisement strategies for those items priced in the survey. The firms are ranked lowest to highest with respect to the total price index of items specialed.[1] Note that Firm C ranked in the lowest position over the 13 weeks, yet their number of advertisements was relatively small (see Table 20). Firm C did, however, substantially increase advertisements at the end of each month, and these apparently must have represented relative food bargains in order for Firm C to rank low in Table 21.[2] Firm A, which was characterized by a large number of advertised specials ranked second lowest over the 13 weeks. In five out of the 13 weeks Firm A ranked fourth or fifth highest, showing rather extreme variation in the quality of the advertisements used. In some weeks the items advertised represented relative food bargains, while in other weeks they did not. Firm D ranked fourth or fifth highest in nine out of 13 weeks reflecting little if any bargaining advantages or opportunities for the consumer.

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[1] Items not advertised by any of the firms are disregarded. If only one or two firms did not advertise a particular item, the average price of the item advertised by other firms was used.

[2] Recall also that the total food index remained constant or increased for Firm C during the same interval.

Table 21

FIRM ADVERTISEMENTS COMPARED USING
ITEMS IN QUESTIONNAIRE

| Week | Range | Index Rank | | | | | Mean Index |
		1	2	3	4	5	
1	28.7 - 29.1	B	E	D	C	A	28.9
2	35.8 - 36.0	C	E	A	D	B	35.9
3	33.9 - 34.7	E	C	A	D	B	34.4
4	21.3 - 26.5	E	C	D	A	B	26.4
5	31.6 - 32.0	A	C	B	E	D	31.8
6	28.4 - 28.9	E	C	D	B	A	28.6
7	36.8 - 37.8	E	A	B	D	C	37.2
8	26.6 - 27.6	E	B	C	A	D	27.2
9	35.4 - 42.6	C	D	B	A	E	38.2
10	20.4 - 20.7	B	E	A	D	C	20.5
11	40.7 - 41.7	A	C	E	B	D	41.2
12	25.8 - 26.4	A	E	B	C	D	26.0
13	27.5 - 27.9	E	A	B	D	C	27.7
Total Average	58.9 - 59.3	C	A	B	E	D	57.3

A Summary of Aggregate Food Price Behavior

The City of Edmonton was characterized by a wide range of prices among geographical regions, socio-economic regions, firms, stores, products, and over time. The north and south regions of Edmonton, representing the underpriveleged sector of the city reflected similar price levels, movements, and variances. The more affluent areas in the east and west regions of the city exhibited low price levels but reflected wide differences in price movements and variance levels.

Stores throughout the city displayed exorbitant variations in price strategy, resulting in gross price differences. In particular, stores in the same chain showed wide price differences both in level and volatility, depending on conditions associated with market segregation. Ranking individual stores within a chain according to their total price index resulted in a multitude of variations in the relative positions of each outlet. Consequently, from the consumer's point of view the aggregate price levels of individual stores reflected inconsistent movements. One week a neighborhood outlet could be the least expensive in the firm, and the next week it would rank remarkably high.[1]

Individual chains revealed immoderate inconsistencies in price levels, and all reflected pricing patterns distinct from those of independent outlets. The discount operations, whether independent or chain affiliated, had the lowest aggregate price levels. The largest, most heavily concentrated chain proved to be the least expensive next to the discount operations. The remaining chains ranked in various positions

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[1] It would be a difficult task for an individual consumer to make such comparisons without computer facilities.

depending on the items, the location, and the time prices were monitored. Stores in the largest chain consistently ranked lower in price than any of the stores associated with other firms. If Firm B, for example, had an outlet in one area that was relatively low priced, the Firm A outlet in the same area would be even lower in price. At the same time, if Firm G had an outlet which was comparatively expensive in another area, the Firm A outlet in that area would also be relatively expensive but still lower in price. This phenomenon was evident in all cases except where discount outlets were situated.

Individual food items disclosed extreme price differences between stores, area, and weeks. Meat items especially played a major role in ranking stores in their various positions. Advertised specials were particularly prominent in meats and specifically in beef products. Chain stores displayed greater price volatility in meats, while the discount operations had larger price variance in the staple items. Consequently, the comparative food bargains could often be found in the chain-affiliated stores in meat items and in the discount operations in staple products. Private label items often represented relative food bargains but were invariably more volatile in price than national brands, complicating consumer price comparisons.

A Synopsis of Frequency and Sources of Price Change

Prices were changed on many items at least once a week, if not more often depending on the particular time of the month. The timing of price changes by chains reflected both the weekend special and the month end payment concepts. Individual chains usually advertised

price specials on either Wednesday, Thursday, or Friday, corresponding

to weekend shopping habits. The number of advertisements and the number

of price changes increased dramatically towards the end of the month and

in some cases quadrupled. Generally the total food index remained

constant or rose during the same period. In the largest chain parti-

cularly the average weighted price index of all stores invariably was

higher at the end of each month, corresponding to the increased number

of advertised specials. Either the advertised price specials were

offset by increased prices in other items or, in fact, specials were not

price specials but were advertisements representing normal or above

normal prices. Food prices in Firm A stores failed to correspond to

advertised prices carried in the local paper.[1] The specials were either

not marked on shelves or marked so inadequately that price takers

failed to record them. Thus the consumer met with a similar problem

and would not obtain the advertised price unless it was recorded by

the cashier. In either case the consumer was left in a vulnerable

bargaining position. Such pricing tactics reduce the consumer's

ability to make rational food purchasing decisions unless he is equipped

with a wide knowledge of advertised food specials and actual food prices

in a large number of stores.

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[1] Stores within Firm A that did correspond to price advertise-
ments closely were experiencing the higher degree of competition. They
were situated close to discount operations.

CHAPTER V

CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Market implications regarding industrial strategy and public policy are derived from the foregoing observations and analysis. This chapter concludes with recommendations regarding future research in food retailing and the role of public institutions in formulating competition policy in the light of pricing efficiency.

Market Strategy - The Cause and the Consequence

Price and non-price strategy employed by food retailing organizations is both the cause and the consequence of market environment. Empirical results suggest individual firms differentiate their markets and price according to the demand in those delineated subsets. Price differences may be due to varying costs, but appreciable cost differences are not evident. Within single firms stores are of comparatively equal size and the source of supply for raw materials is centrally located. Demand orientated pricing is based on the intensity of demand; higher prices are charged where demand is intense and lower prices are charged when and where demand is weak. Costs can be identical in both cases. Such pricing strategy can take one of two forms or be a combination of both. Empirical results indicate that overlying market conditions do facilitate the two strategic approaches.

The first form of strategy is price discrimination and is defined as the sale of a commodity at two or more price levels that do not correspond to proportional changes in marginal cost. The required or necessary conditions for such strategy as outlined by Kotler are:

a segmentable market, little chance of competitors underselling the

firm in the segmented market being charged the higher price, and the

cost of segmenting (and policing) the market not to exceed the extra

revenues derived from the price discrimination.[1,2] All of these condi-

tions, without exception, are evident in the Edmonton market and could

readily be exploited especially by the more concentrated firms.

The second possibility is competition orientated pricing,

generally defined as setting prices according to what the competition

is charging, reflecting no rigid relationship between price, costs, or

demand. Again this strategy is extremely feasible. Price differences

between markets indicate varying degrees of competition and price

similarities between pairs of competing stores reveal the degree of

competitive influence.

Both strategic tactics referred to above represent rational

market behavior on the part of the firm and correspond equally well

to a theoretical application. If the individual firm experiences a

number of individual demand curves, traditional economic theory

regarding profit maximization, competition reduction, and price leader-

ship are readily applied. In profit maximization, for example, it

can be shown that the firm reaps the highest returns by equating

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[1] Philip Kotler, Marketing Management, Analysis, Planning, and Control (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1967), p. 366.

[2] A large degree of individual store management discretion can be used efficiently here.

marginal cost to marginal revenue where price is related to both in the following way:[1]

$$MC = MR = (1 + \frac{1}{e})P$$

where e = price elasticity of demand. The optimal markup can thus be calculated as

$$\frac{P - AC}{AC} = \frac{1}{e + 1}$$

(It is assumed AC = MC in the profit maximizing situation.)

Thus by knowing the segregated elasticities of demand, the firm can, in theory or in actuality, price accordingly, exploiting the profit curve to the limit. This situation is subject to the degree of competition and the price elasticity of demand in the market. To maintain or increase the segregated market share, while simultaneously decreasing the competitive forces and price elasticity of demand, the individual firm simply adjusts the markup. If the markup in play is below the figure that would be calculated using the formula Markup = 1/e+1, the firm has deviated from the maximum profit goal and is concentrating more on a market share improvement policy.

A price leader in this situation could readily employ such strategy. Areas reflecting inelastic demand with regard to price can be easily exploited as a price leader has little fear of being under priced. In many cases the competitors experiencing higher costs enjoy the buoyant or "umbrella" effect offered by the price leader. These conditions allow the price leader to effectively compete in areas of high price elasticity of demand or the highly competitive areas. By

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[1] Philip Kolter, op. cit., p. 362.

employing a lower markup in these highly competitive regions, the market

share is maintained or increased (the demand curve moving to the right),

simultaneously having a decreasing effect on the elasticity of demand.

When the elasticity of demand is reduced, markups can be normalized in

the sense the firm can re-raise them to increase profits.

In summary, certain market conditions are evident, which would

readily facilitate the use of the strategic tactics mentioned, from

empirical market observations. To determine the degree to which they

are practiced, market performance must be evaluated. To this end the

elements fostering price efficiency were examined resulting in conclu-

sions regarding market performance and its practical evaluation.

Price Efficiency Evaluation

Price efficiency is required for either an improvement in

social welfare or the incremental development of an ideal economy.

The extent to which each individual characteristic of price efficiency

is satisfied enhances the possibility of achieving the ideal socio-

economic community. The entire evaluation of price efficiency develops

workable (and hopefully effective) criteria for determining market

performance.[1] Each element will be singularly examined.

The degree of competition in the market is highly variable.

If more competition is theoretically better than less, the market could

readily use an improvement as highly competitive regions consistently

reflect the lowest retail prices. The implication is that price

inefficiency is prevalent in the higher priced, less competitive markets.

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[1] See page 2 for the examination format used in evaluating
price efficiency.

Restrictions to market entry exist in the form of formidable competition in segregated areas where new stores are opened. Independent operations entering the industry face the problem of acquiring a share of the market. To acquire this market share necessitates using highly competitive price strategy. This strategy, however, is soon imitated by the neighborhood chain store, intensifying the independent's problem of obtaining a market share. By contrast new outlets opened by a major chain reflect comparatively high prices. If an independent operation even attempted to enter the market using prices equivalent to those carried by the chain store it would inevitably suffer an economic death; in fact, it may succumb.

Another factor restricting market entry is evident in large-scale advertising. The supermarket chains, especially Firm A, advertise to the greatest extent, yet their affiliated outlets are not the lowest priced stores in Edmonton. Consequently, large-scale advertising facilitates the use of higher price markup by these firms, while placing a formidable barricade in the path of potential competitors.

Adequate, honest, and uniform information equally distributed between market members is not an apparent characteristic of the market; at least the channel between retailers and consumers shows deficiencies. Whether the information passed from retailers to consumers is in the form of actual on-shelf prices, advertisements in the city paper, or neighborhood flyers, it is often inadequate, misleading, not uniform, and unequally distributed among intended recipients.

Information is inadequate as considerably more could be made available to consumers on a larger number of items. A comparatively

few advertised specials tell the consumer little about the aggregate

price level; consequently, these bits and pieces of selected information

are tantalizers baiting and confusing the potential consumer. Lack of

information virtually promotes irrational decision making. Consumer

exploitation is inevitable.

Information can be misleading, particularly when city-wide

advertisements are not rigidly adhered to by all stores in the par-

ticular chain responsible. If the consumer cannot rely on the integ-

rity of the chain store to display correct prices, he must consistently

check and compare posted prices with advertised specials calling any

discrepancies to the attention of staff or management to obtain the

price saving.

The frequency and amount of information passed on to the

consumer is not uniform. Food bargains are available during the interim

between end of the month influxes of advertising but are seldom brought

to the attention of the consumer. A comparatively large amount of

price information in the form of specials is passed on to consumers

when they are most vulnerable--immediately after they have been paid.

The average consumer is not so eager to spend money during the month

and, as a result, may often miss price savings on unadvertised items.

Conversely, the customer buys non-advertised items at the same time he

shops to take advantage of the specials. Often he pays more at the

end of the month than during any other period.

Information is not equally distributed, for segregated

neighborhood flyers relate to price savings only applicable to that

isolated fraction of the population. Segregated advertising and other

forms of price information often go unnoticed or unused by the unaware, the uneducated, the elderly, the immobile, and the native population. The fact that these people do not read, are unable to make rational comparisons, or simply are too poor to capitalize on bulk specials makes them extremely vulnerable to exploitation.

Grades, standards, weighing procedures, and similar measures are policed occasionally in every store and there is a positive effort to define rules and regulations. The extent to which these rules and regulations are adhered was not examined in this study.

The market is unfortunately free from government interference, partly because the rules of the game are not explicit, primarily because the rules are not appropriate. Unappropriate regulations are impossible to enforce effectively. Firms may be operating to the detriment of the consumer yet they still may be within their legal limits. Simultaneously the law combats a socially undesirable market situation on the basis of structural reforms which means prosecution on the grounds of criminal conduct. Reforms based on criminal prosecution are seldom preventive measures and are generally too late to be effective.

In summary, price efficiency in the market suffers from numerous deficiencies. Existing market conditions do not facilitate potential advances in socio-economic welfare. The theoretical and empirical conditions necessary for consumer exploitation are being employed and possibly to the degree that price efficiency is less than optimal. Ultimately if these adverse conditions can be eliminated and the deficiencies corrected through improved pricing efficiency, the level of market performance can be elevated.

Recommendations

The recommendations to follow are orientated toward the promotion of consumer welfare but are not necessarily in order of significance.

Advertising regulations need to be enforced more rigidly if consumers are to be protected from untrue, deceptive, or misleading practices. Retailers must be made explicitly aware of these regulations and fully understand the consequences of non compliance.

> Every one who, for the purpose of promoting the sale or use of an article, makes any materially misleading representation to the public, by any means whatever, concerning the price at which such or like articles have been, are, or will be, ordinarily sold, is guilty of an offence punishable on summary conviction ... [1]

Such offences are punishable by a fine of not more than $500 or imprisonment for six months or both.[2]

The basic rules that guide the government in analyzing advertising for unfair or deceptive tendencies also warrant consideration by businessmen. The following guides are regularly applied by government examiners.

1. The crucial factor of deceptive advertising is a tendency to deceive. There is no requirement that the government prove actual deception of a particular consumer.

2. In a case of false advertising the government does not have to prove knowledge on the part of the advertiser. A firm's deceptive advertising policy could not be excused because individual store managers failed to comply with firm advertisements.

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[1] OECD, Guide to Legislation on Restrictive Business Practices, Europe and North America. Vol. 1-C, Sec. 33c (Paris: Organization for Economic Co-operation and Development, 1967), p. 16.

[2] Ibid., "Explanatory Notes on the Legislation," p. 4.

3. An advertiser may have a wholly innocent intent and yet violate the law.[1]

Consumer education and social improvement programs should be implemented as soon as possible. Education programs on how to buy, what to buy, and when to buy would largely benefit the underprivileged sector if not the entire consumer population. These programs need not be limited to government sponsorship but should include monetary and personnel assistance from university departments such as extension, agriculture, economics, household economics, and sociology as well as private institutions.

Competition policy needs to be more conduct and performance orientated, as many of the contemporary structural forms in industry have great potential for price efficiency. Performance and price efficiency can be improved and maintained by means other than simply structural alterations. Explicit regulations, for example, could be effectively enforced, and specifically designed to prevent market conduct from exploiting the potentially efficient structure. Traditionally the basic problem confronting policy makers has been determining a method by which the efficiencies of the large vertically integrated structure could effectively be passed on to the consumer in the form of price savings. Consider the consequences of a public policy that stipulated all stores within one firm must sell identical products at one price in a metropolitan market, subject to reasonable cost differences. This single stipulation would have a paramount affect on market efficiency and performance. It would increase the competitive

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[1] Earl W. Kintner, _An Antitrust Primer_ (New York: The MacMillan Company, 1964), p. 172.

effect of all existing retail outlets as pricing strategy became more

effective, reduce barriers to market entry as price reductions would

be city-wide and not in segregated markets, lower the price of many

food items as this would be necessary to maintain a reasonable market

share, allow all segments of the metropolitan population, affluent and

underprivileged, to enjoy equal food prices and equal bargaining

positions, and provide effective use of the potential efficiency

existing in large firms. If a single firm in Canada can make a profit

of 2.5 percent of gross sales--1.5 percent higher than other Canadian

firms or its American counterpart--by largely exploiting the underpri-

vileged sector of society, there is a need for change in Canadian

competition policy.

Individual stores within the market should be intensively

examined. One or two retail outlets examined on the basis of at least

1,000 items could dramatically add to the understanding and rationaliza-

tion of modern price merchandising. The individual store manager has

at his disposal scores of strategic elements that are used to establish

both the image the public sees and the criteria by which they make

purchasing decisions.

The socio-economic and cultural elements of society should be

analyzed in conjunction with the formulation of public policy on

structure, conduct, and performance of modern industry. National,

regional, and local policies need to be consumer-orientated, taking

into consideration such factors as income, education, mobility,

environment, age, and culture. Industry differentiates these elements

into individual markets. Society, primarily in planning, loses

direction through excessive generalization and consequently overlooks many segregated problem areas.

The underprivileged sector of society needs help and this help may best be provided through improved long-range planning. Structural changes are required, particularly in planning and developing the shape of future cities. For example, generally if the affluent sectors of society are less susceptible to price exploitation then locate low rental establishments and old age homes in these areas. At least the old and the poor could enjoy the lower food prices experienced by the affluent society.

A price analysis on beef should be carried out, relating the prices received by producers, wholesalers, and retailers. Hopefully the spread between price levels could be explained. If not, the deficiencies in market performance warrant exposure and correction.

In summary, the retail food industry in Edmonton suffers from numerous deficiencies. The market imperfections are concentrated in the areas of consumer price information, socio-economic opportunity, and competitive market strategy and behavior. Market conduct in the form of price and non-price strategy must be publicly reviewed. Competition policy will continue to be a charade if it endeavours to improve market performance solely by attacking the structure of contemporary industrial organizations. The structure has evolved as the result of prolonged competitive conditions; consequently it is potentially efficient. The challenge before society is not to destroy the structure but rather to exploit its attributes through effective regulation of market conduct.

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APPENDICES

APPENDIX A

Table 1

RETAIL STORES IN PRICE SURVEY[1]

Region	Store No.	Firm	Region	Store No.	Firm
North	6	A	East	17	D
	7	A		18	A
	8	B		19	F
	9	D		28	A
	10	A		20	A
	11	A		21	B
	12	G		29	A
	24	C			
South	13	E	West	1	A
	25	A		2	A
	14	A		3	A
	15	A		4	B
	16	B		22	C
	23	A		26	F
	27	F		5	A

[1] Store number 6 was closed half-way through the study. A new store was opened by the same firm in the same area and was priced from weeks 9 to 13 inclusive.

Table 2

FOOD ITEMS PRICED IN SURVEY

Product	Brand	Weight
1. Sirloin steak, boneless	Beef	1 lb.
2. Round steak, bone in	Beef	1 lb.
3. Prime rib roast, standing	Beef	1 lb.
4. Blade roast, blade out	Beef	1 lb.
5. Stewing beef, boneless	Beef	1 lb.
6. Ground beef	Beef	1 lb.
7. Liver, sliced beef	Beef	1 lb.
8. Loin chops, center cut	Pork	1 lb.
9. Loin chops, rib end	Pork	1 lb.
10. Shoulder roast	Pork	1 lb.
11. Veal steak or cutlet		1 lb.
12. Lamb leg, fresh (shank on)		1 lb.
13. Cottage Roll, ready to eat	T.P.L.[1]	1 lb.
14. Fresh sausage	T.P.L.	1 lb.
15. Fresh sausage	P.L.[2]	1 lb.
16. Bacon	Maple Leaf or T.P.L.	1 lb.
17. Bacon	P.L.	1 lb.
18. Wieners	Maple Leaf or T.P.L.	1 lb.
19. Wieners	P.L.	1 lb.
20. Chicken (2-4 lbs.)		1 lb.
21. Turkey (8-16 lbs.)	Grade A (not butterball)	1 lb.
22. Ham, bone in, ready to eat	T.P.L.	1 lb.
23. Ham, boneless, ready to eat	T.P.L.	1 lb.
24. Canned ham	Maple Leaf	1 1/2 lb.
25. Canned meat	Klik	12 oz.
26. Flaked white tuna	Clover Leaf	6 oz.
27. Sardines	Brunswick	3 1/4 oz.
28. Cohoe salmon	Gold Seal	7 3/4 oz.
29. Evaporated milk	Carnation	1 lb.
30. Instant skimmed milk powder	Mil-ko	3 lb.
31. Grade A large eggs	T.P.L.	1 doz.
32. Butter	T.P.L.	1 lb.
33. Cheeze Whiz	Kraft	1 lb.
34. Velveeta cheeze	Kraft	2 lb.
35. Cream cheeze	Philadelphia	4 oz.
36. Medium cheddar cheeze	Black Diamond	12 oz.
37. Potatoes, fresh	Canada Number 2 (any brand)	10 lb.
38. Tomatoes, fresh	Canada Number 1 (cello-pak)	4 tomatoes
39. Onions, fresh	Canada Number 1 (any brand)	3 lb. bag
40. Jell-O powder	Jell-O	3 oz.

Table 2 (continued)

Product	Brand	Weight
41. Regular grind coffee	Nabob	1 lb.
42. Instant coffee	Maxwell House	2 oz.
43. Orange Pekoe tea bags	Red Rose	60 bags
44. Instant chocolate	Nestle's Quick	1 lb.
45. White granulated sugar	Alberta	2 lb.
46. Corn oil	Mazola	24 oz.
47. Shredded Wheat	Nabisco	18 biscuits
48. All-Bran	Kelloggs	16 oz.
49. Bread	P.L.	5-20 oz. loaves
50. Chocolate chip cookies	Dare	1 lb.
51. Potato chips	Nalleys	3 pak. 9 oz.
52. Potato chips	Old Dutch	3 pak. 9 oz.
53. Pre-sifted all purpose flour	Robin Hood	20 lb.
54. Shortening	Domestic	1 lb.
55. Pastry lard	T.P.L. or Maple Leaf Tenderflake	1 lb.
56. Margarine	Blue Bonnet or Good Luck	1 lb.
57. Margarine	Tulip or Rose	1 lb.
58. Margarine	P.L.	1 lb.
59. Fruit cocktail (choice)	Hunts	14 oz. can
60. Sliced peaches (fancy)	York or T.P.L.	14 oz. can
61. Cut green beans (fancy)	York or T.P.L.	14 oz. can
62. Cut green beans (choice)	P.L.	14 oz. can
63. Corn niblets (fancy)	Green Giant or T.P.L.	12 oz. can
64. Corn niblets (choice)	P.L.	12 oz. can
65. Deep buttered peas	Libby's or T.P.L.	14 oz. can
66. Beans with Pork	Libby's or T.P.L.	14 oz. can
67. Beans with Pork	P.L.	14 oz. can
68. Baby dills	Bicks or T.P.L.	15 oz. jar
69. Tomatoe juice	Libby's	48 oz. can
70. Tomatoe juice	Heinz	48 oz. can
71. Tomatoe juice	P.L.	48 oz. can
72. Canned pop	P.L.	10 oz. can
73. Strawberry jam	York or T.P.L.	48 oz. can
74. Peanue butter	York or T.P.L.	3 lb.
75. Honey	Alta-Sweet	1 lb.
76. Ice cream	T.P.L.	3 pints
77. Ice cream	P.L.	3 pints

[1] T.P.L. means Top Price Line.

[2] P.L. means Private Label.

Table 3

WEIGHTED PRICE INDEX BASED ON AGGREGATE VALUE OF
PER CAPITA FOOD CONSUMPTION BY ITEM

Food Items	Share of Total Food Basket
	(percent)
Beef	11.97
Pork	3.59
Veal and Lamb	0.59
Chicken and Turkey	3.79
Sausage	0.95
Bacon	1.88
Weiners	1.79
Ham (Fresh)	1.53
Ham (Canned)	0.34
Meat (Canned)	1.88
Fish	1.90
Eggs	4.40
Dairy Products	17.40
Fats and Oils	4.90
Fruits	8.00
Vegetables	10.30
Potatoes	2.90
Cereal Products	7.40
Sugars and Sweeteners	7.30
Soup, Baby Food, and Desserts	1.10
Coffee, Tea, and Cocoa	3.60
Miscellaneous (Melons, nuts, etc.)	2.49
	100.00

Beef through Meat (Canned): 28.31 [1]

Fish through Miscellaneous: 71.69 [2]

[1] M. H. Hawkins, "An Analysis of Structure and Conduct in the Wholesale Meat Industry in Ohio" (unpublished Ph.D. dissertation, Ohio State University, 1967).

[2] United States National Commission on Food Marketing Technical Study No. 7, op. cit., p. 7. Also, Canada Dominion Bureau of Statistics, Urban Family Food Expenditure (Ottawa: Queen's Printer and Controller of Stationery, 1962), pp. 46-53.

Table 4

A COMPARISON OF STORE RANKING, USING RAW PRICE
INDEX LEVELS AND WEIGHTED PRICE INDEX LEVELS[1]

	Store Number Ranked	
Ranking Number	Raw Index	Weighted Index
1	23	19
2	26	26
3	27	27
4	11	23
5	19	20
6	24	18
7	6	10
8	25	6
9	16	29
10	10	7
11	28	11
12	22	28
13	20	1
14	8	2
15	15	3
16	1	21
17	5	16
18	7	5
19	4	4
20	2	15
21	3	14
22	14	25
23	21	22
24	17	24
25	29	8
26	13	13
27	18	17
28	9	9
29	12	12

[1] Ranking is lowest to highest
(lowest is number one).

NOTE: Extreme changes in ranking are evident, for example, store
number 18 was ranked 27 in the raw price index column,
while in the weighted price index column it was ranked
number 6. Data used in the comparison represents an 11-
week summary of prices.

Table 5

REGRESSION ANALYSIS
(ORIGINAL DATA - 29 STORES)

Weighted Price Index Levels Dependent Variable	Weighted Price Variance Levels Independent Variable
67.02	31.07
66.90	42.60
67.12	44.30
68.01	69.47
67.34	53.42
67.01	56.32
66.99	50.10
68.47	103.83
70.29	44.68
66.81	29.94
67.29	95.95
71.78	129.67
69.90	81.91
67.71	70.41
67.75	69.06
67.78	93.14
70.06	101.17
66.63	82.13
64.43	134.90
66.04	66.59
67.69	85.58
68.04	52.85
65.50	52.62
68.04	54.79
67.64	47.31
64.41	41.01
64.82	114.66
66.96	83.66
67.18	61.21

Table 6

REGRESSION ANALYSIS
(ORIGINAL DATA - FIRM A)

Weighted Price Index Levels Dependent Variable	Weighted Price Variance Levels Independent Variable
65.44	31.07
65.11	42.60
65.83	44.30
66.63	53.42
66.59	56.32
66.33	50.10
66.50	29.94
66.44	95.94
66.88	70.41
68.08	69.06
66.92	82.13
66.45	66.59
65.40	52.63
66.51	47.31
66.82	83.66
66.89	61.21

Table 7

. NAMES AND ADDRESSES OF RETAIL STORES IN PRICE SURVEY

Name	Address
Co-op	12725 - 82 Street
Discount	14735 - 125 Avenue
Discount	7939 Argyle Road
Dominion	10125 Princess Elizabeth Avenue
Dominion	Bonnie Doon Shopping Centre
Economart	62 Street and 101 Avenue
IGA	11626 - 87 Avenue
Loblaws	107 Avenue and 142 Street
Loblaws	10210 Princess Elizabeth Avenue
Loblaws	109 Street and 72 Avenue
Loblaws	50 Street and 101 Avenue
Safeway	14920 - 87 Avenue
Safeway	156 Street and 87 Avenue
Safeway	Centennial Mall
Safeway	12620 - 132 Avenue
Safeway	9411 Jasper Avenue
Safeway	10725 - 97 Street
Safeway	102 Street and Princess Elizabeth Avenue
Safeway	12804 - 82 Street
Safeway	8930 - 82 Avenue
Safeway	8210 - 109 Street
Safeway	8065 - 104 Street
Safeway	6835 - 83 Street
Safeway	7455 - 101 Avenue
Safeway	9532 - 87 Street
Safeway	Capilano Shopping Centre
Safeway	Sherwood Park
Woodwards	Westmount Shopping Centre
Woodwards	Northgate Shopping Centre

APPENDIX B

Analysis of Variance

To illustrate the analysis procedure one can calculate the variance of the fourth product in stores one and two over an 11-week period. The original data is as follows:

Weeks	Store 1	Store 2
1	101	101
2	0*	101
3	101	101
4	118	111
5	118	118
6	0	0
7	0	0
8	0	118
9	0	152
10	0	0
11	0	0

* Zeros indicate the store did
not carry item 4 in that week.

Substituting into our formula

$$V(Ri) = \Sigma i \Sigma s (Risw - \bar{R}iw)^2 / N$$

$$\text{where } \bar{R}iw = \Sigma_{S=1}^{SS} Risw = \frac{118 + 111}{2} = 114.5$$

Note that the only week that any variance occurred was week four because in the other weeks either the prices were identical or one or both stores did not carry the item resulting in no variance. (Missing elements are filled with that week's store average which does not bias the mean but would bias the variance estimate if used; hence only non zero elements can be counted.) As a result Risw is summed over one product, two stores, and one week.

$$T = SS = SS\bar{z} = 2 - 0 = 2 \text{ or total number of stores.}$$

Substituting further into the formula:

$N = II \cdot SS \cdot WW - NZERO$

$= 22 - 11 = 11.$

Therefore,

$$V(Ri) = \frac{(118 - 114.5)^2 + (111 - 114.5)^2}{11}$$

$$= \frac{(3.5)^2 + (3.5)^2}{11}$$

$$= \frac{21.35}{11}$$

$$= 1.94$$

Chi-Square Test of Independence

Chi-square was computed as

$$X^2 = \Sigma_i \Sigma_j \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

where

O_{ij} = observed number in the $(ij)^{th}$ cell,

$E_{ij} = R_i C_j / n$ = expected number in the $(ij)^{th}$ cell,

$R_i = \overset{c}{\underset{d=1}{\Sigma}} O_{ij}$ = observed number in the ith row, and

$C_j = \overset{r}{\underset{i=1}{\Sigma}} O_{ij}$ = observed number in the jth column.

The following contingency table was prepared for all stores in the study.

Table 8

CONTINGENCY TABLE FOR ALL STORES

Variance	Level	
	High	Low
High	$O_{11} = 9$, $E_{11} = 6.76$ $d* = 2.24$, $d^2 = 5.02$ $X_{11}^2 = 0.74$	$O_{12} = 5$, $E_{12} = 7.24$ $d = 2.24$, $d^2 = 5.02$ $X_{12}^2 = 0.69$
Low	$O_{21} = 5$, $E_{21} = 7.24$ $d = 2.24$, $d^2 = 5.02$ $X_{21}^2 = 0.69$	$O_{22} = 10$, $E_{22} = 7.75$ $d = 2.25$, $d^2 = 5.06$ $X_{22}^2 = 0.65$

$$* \quad d = (O_{ij} - E_{ij})$$

The median price and variance levels were used to classify the stores with respect to high or low levels of each.

Median price level - 67.30.
Number of stores classified as low = 15.
Number of stores classified as high= 14.

Median variance level - 67.30.
Number of stores classified as low = 15.
Number of stores classified as high= 14.

O_{22} = Number with low level and low variance = 10

O_{11} = Number with high level and high variance = 9

O_{21} = Number with high level and low variance = 5

O_{12} = Number with low level and high variance = 5

$$E_{11} = \frac{14 \times 14}{29} = 6.76$$

$$E_{21} = \frac{14 \times 15}{29} = 7.24$$

$$E_{12} = \frac{15 \times 14}{29} = 7.24$$

$$E_{22} = \frac{15 \times 15}{29} = 7.25$$

$$X^2 = \Sigma_i \Sigma_j \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

or $0.74 + 0.69 + 0.69 + 0.65 = 2.77$

Because 2.77 was less than the chi-square value that was expected due to randomness (3.84), the hypothesis that price variation was independent of price level could not be rejected.

Exactly the same procedure was used for stores in Firm A. The contingency table was constructed as follows:

Table 9

CONTINGENCY TABLE FOR FIRM A STORES

Variance	Level	
	High	Low
High	$O_{11} = 8$, $E_{11} = 4$ $d = 4$, $d^2 = 16$ $X^2_{11} = 4$	$O_{12} = 8$, $E_{12} = 4$ $d = 4$, $d^2 = 16$ $X^2_{12} = 4$
Low	$O_{21} = 8$, $E_{21} = 4$ $d = 4$, $d^2 = 16$ $X^2_{21} = 4$	$O_{22} = 8$, $E_{22} = 4$ $d = 4$, $d^2 = 16$ $X^2_{22} = 4$

Median price level   = 66.50
Median variance level = 55.20

Variance	Level
Low = 8	Low = 8
High = 8	High = 8

$$E_{11} = \frac{8 \times 8}{16} = 4 \qquad E_{12} = \frac{8 \times 8}{16} = 4$$

$$E_{21} = \frac{8 \times 8}{16} = 4 \qquad E_{22} = \frac{8 \times 8}{16} = 4$$

$$X_{ij}^{2} = 4 + 4 + 4 + 4 = 16.0$$

Because 16.0 was greater than the chi-square value expected due to randomness (3.84), the hypothesis that price variation was independent of price level was rejected.

APPENDIX C

Frequency Analysis of Price Discrepancies

The following example outlines the basic technique used in the analysis. Ground beef was chosen as the product to be examined and its prices were observed in week two of the survey in all stores affiliated with Firm A. The results are as indicated below.

Table 10

PRICE FREQUENCY ANALYSIS

Price of Ground Beef	Store Number															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Week 2	65	65	65	65	65	65	65	65	56	65	65	59	59	65	65	67

The value that occurs most frequently is 65; consequently, this is the value of the mode and is used as the price norm for that week. Discrepancies are evident in store numbers 9, 12, and 13, and all three price differences are at least greater than 5 percent of the price mode. As a result, the value 3 represents the frequency of price discrepancies in ground beef during week 2.

The following table summarizes the results of the frequency analysis undertaken on all beef prices monitored in the 13-week survey.

Table 11

FREQUENCY ANALYSIS OF PRICE DISCREPANCIES IN BEEF PRODUCTS

Weeks				Frequency of Price Discrepancies				
	Sirloin Steak	Round Steak	Prime Rib Roast	Blade Roast	Stewing Beef	Ground Beef	Liver (Beef)	Weekly Total All Products
1	4	2	5	6	2	1	1	21
2	5	3	0	3	0	3	1	15
3	1	2	0	6	2	3	3	17
4	1	1	3	8	2	1	2	18
5	3	4	5	7	1	5	2	27
6	0	2	0	4	0	8	0	14
7	0	3	1	3	0	2	1	10
8	4	6	1	5	3	5	1	25
9	3	5	2	6	2	7	0	25
10	6	5	7	4	1	7	0	30
11	1	4	5	6	3	8	4	31
12	5	9	9	6	7	2	4	42
13	4	6	6	2	6	5	2	31
Product Total All Weeks	37	52	44	66	29	57	21	306

The maximum number of possible prices is 1,546 (13 x 16 x 7), however, approximately 80 prices were not recorded because the store did not carry the item at the particular time. As a result, price discrepancies occurred approximately 22 percent of the time (306/1566 x 100). In other words, Firm A had a different price for each beef item in at least one of every five stores within the city.